

January 20, 2003

Mr. Steve Trent Fluor Hanford Inc. 825 Jadwin Avenue Richland, WA 99352



Reference:

P.O. #630

Eberline Services R2-11-101-7401, SDG(H1984

Dear Mr. Trent:

Enclosed is the data report for one solid sample designated under SAF No. F03-005 received at Eberline Services on November 21, 2002. The sample was analyzed according to the accompanying chain-of-custody document.

Please call if you have any questions concerning this report.

Sincerely,

Melissa C. Mannion

Melini Marmon

Program Manager

MCM

Enclosure: Data Package



Analytical Services 2030 Wright Avenue P.O. Box 4040 Richmond, California 94804-0040 (510) 235-2633 Fax (510) 235-0438 Tolf Free (800) 841-5487 www.eberlineservices.com

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1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H1984 was composed of one solid (soil) sample designated under SAF No. F03-005 with a Project Designations of: 200 Area Source Characterization 200-CS-1 OU – Waste Man. The sample in SDG H1984 (7401) was batched with the sample in SDG H1977 (7396).

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta Analyses

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.3 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.4 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

2.5 Isotopic Uranium Analyses

Per FH's instructions, sample B15YP9 was not analyzed for isotopic uranium (see e-mail attached).

2.6 Total Uranium Analyses

No problems were encountered during the course of the analyses.

2.7 Neptunium-237 Analyses

No problems were encountered during the course of the analyses.

2.8 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.9 Transplutonic Analyses (Am-241, Cm-242, and Cm-243/244)

No problems were encountered during the course of the analyses.

Case Narrative

Page 2 of 2

2.10 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melini Manna Melissa C. Mannion

1/20/3

Program Manager



Stephen_J_Trent@RL. gov

To: mmannion@eberlineservices.com

CC:

01/06/2003 01:08 PM Subject: SDGs H1969, H1977, H1982, H1984, and H1996 total U

.

Melissa,

7391 7396 7399 2002 7414

We will not need to run isotopic U on SDGs SDGs H1969, H1977, H1982, H1984, and H1996.

Thanks,

Steve J. Trent Sample Management Project Coordinator Fluor Hanford - Central Plateau Project

Ph: (509) 373-5869 EFax: (866) 252-5816 Site Pager: 85-7344

SDG 7401 Contact Melissa C. Mannion Client <u>Hanford</u>
Contract <u>No. 630</u>
Case no <u>SDG H1984</u>

SUMMARY DATA SECTION

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Reviewed by

SAMPLE DELIVERY GROUP H1984

SDG 7401
Contact Melissa C. Mannion

REPORT GUIDE

Client	Han	ford	
Contract	No.	630	
Case no	SDG	H1984	

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

REPORT GUIDES
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SUMMARY DATA SECTION
Page 1

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06

Report date <u>01/20/03</u>

SAMPLE DELIVERY GROUP H1984

SDG 7401
Contact Melissa C. Mannion

GUIDE, cont.

Client <u>Hanford</u>
Contract <u>No. 630</u>
Case no <u>SDG H1984</u>

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

REPORT GUIDES

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SUMMARY DATA SECTION

Page 2

Lab id EBRLNE

Protocol <u>Hanford</u>

Version Ver 1.0

Form <u>DVD-RG</u> Version <u>3.06</u>

Report date <u>01/20/03</u>

SDG	7401		
Contact	<u>Melissa</u>	Ç.	Mannion

SAMPLE SUMMARY

Client	<u>Kanford</u>	
Contract	No. 630	
Case no	SDG H1984	

CLIENT SAMPLE ID	LOCATION	MATRIX LEVEL	LAR SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B15YP9	SP~3	SOLID	R211101-01	F03-005	F03-005-015	11/18/02 09:05
Method Blank		SOLID	R211088-03	F03-005		
Method Blank		SOLID	R211088-06	F03-005		
Lab Control Sample		SOLID	R211088-02	F03-005		
Lab Control Sample		SOLID	R211088-05	f03-005		
Duplicate (R211101-01)	SP-3	SOLID	R211101-02	F03-005		11/18/02 09:05

SAMPLE SUMMARY
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Lab id <u>EBRLNE</u>

Protocol <u>Hanford</u>

Version <u>Ver 1.0</u>

Form <u>DVD-CS</u>

Version <u>3.06</u>

Report date <u>01/20/03</u>

SAMPLE DELIVERY GROUP H1984

SDG 7401 Contact <u>Melissa C. Mannion</u>

QC SUMMARY

Client	<u> </u>
Contract	No. 630
Case no	SDG_H1984

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE. Amount	BASIS AMOUNT	DAYS RECEIVED		LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7396		Method Blank	SOLID						R211088-03	7396-003
		Method Blank	SOLID						R211088-06	7396-006
		Lab Control Sample	SOLID						R211088-02	7396-002
		Lab Control Sample	SOLID						R211088-05	7396-005
7401	F03-005-015	B15YP9	SOL ID	94.3 9	961.2 g		11/21/02	3	R211101-01	7401-001
		Duplicate (R211101-01)	SOLID	94.3 9	961.2 g		11/21/02	3	R211101-02	7401-002

QC SUMMARY
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SDG <u>7401</u> Contact <u>Melissa C. Mannion</u>

PREP BATCH SUMMARY

Client <u>Hanford</u>
Contract <u>No. 630</u>
Case no <u>SDG H1984</u>

			PREPARATION	ERROR			- PLANCHETS ANALYZED				- QUALI-
TEST	MATRIX	METHOD	BATCH	20 %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG MS/ORIG	FIERS
Alpha	Spectros	scopy				_					
NP	SOLID	Neptunium in Soil	7052-079	5.0	1			1	1	1/1	
PU	SOLID	Plutonium, Isotopic in Solids	7052-079	5.0	1		_	1	1	1/1	
тн	SOLID	Thorium, Isotopic in Soil	7052-079	5.0	1			1	1	1/1	
TP	SOLID	Americium 241/Curium in Solids	7052-079	5.0	1			1	1	1/1	
Beta	Counting	,							-	·	
SR	SOLID	Total Strontium in Soil	7052-079	10.0	1			1	1	1/1	
Gas P	roportion	nal Counting									
93A	SOLID	Gross Alpha in Soil	7052-079	20.0	1			1	1	1/1	
93B	SOLID	Gross Beta in Soil	7052-079	15.0	1			1	1	1/1	
Gamme	Spectros	сору				<u>. – </u>		-	_		
GAM	SOLID	Gamma Scan	7052-079	15.0	1			1	1	1/1	
Kinet	ic Phosph	orimetry					-				
ז_ע	SOL ID	Uranium, Total in Soil	7052-079	9.0	1		_	1	1	1/1	
Liqui	d Scintil	lation Counting			-						_
c ——	SOLID	Carbon 14 in Soil	7052-079	10.0	1			1	1	1/1	

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY
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Lab id <u>EBRLNE</u>

Protocol <u>Hanford</u>

Version <u>Ver 1.0</u>

Form <u>DVD-PBS</u>

Version <u>3.06</u>

Report date <u>01/20/03</u>

SDG 7401 Contact <u>Melissa C. Mannion</u>

WORK SUMMARY

Client <u>Hanford</u>

Contract <u>No. 630</u>

Case no <u>SDG H1984</u>

CLIENT SAMPLE : LOCATION CUSTODY	ID SAF No	MATRIX	LAB SAMPLE ID COLLECTED RECEIVED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD
B15YP9			R211101-01	7401-001	93A/93		01/14/03	01/20/03	мсм	Gross Alpha in Soil
SP-3		SOLID	11/18/02	7401-001	93B/93		01/07/03	01/20/03	MCM	Gross Beta in Soil
F03-005-015	F03-005		11/21/02	7401-001	C .		12/24/02	01/20/03	MCM	Carbon 14 in Soil
,				7401-001	GAM		01/15/03	01/20/03	MCM	Gamma Scan
				7401-001	NP		01/15/03	01/20/03	мсм	Neptunium in Soil
				7401-001	PU		01/16/03	01/20/03	MCM	Plutonium, Isotopic in Solids
				7401-001	SR		01/06/03	01/20/03	MCM	Total Strontium in Soil
				7401-001	TH		01/15/03	01/20/03	MCM	Thorium, Isotopic in Soil
				7401-001	TP.		01/17/03	01/20/03	MCM	Americium 241/Curium in Solids
				7401-001	U_T		12/19/02	12/21/02	MCM	Uranium, Total in Soil
Method Blank			R211088-03	7396-003	93A/93		01/06/03	01/20/03	MCM	Gross Alpha in Soil
		SOLID		7396-003	93B/93		01/06/03	01/20/03	мсм	Gross Beta in Soil
	F03-005			7396-003	С		12/23/02	01/20/03	MCM	Carbon 14 in Soil
				7396-003	GAM		01/06/03	01/20/03	MCM	Gamma Scan
				7396-003	NP		01/15/03	01/20/03	MCM	Neptunium in Soil
				7396-003	PU		01/15/03	01/20/03	MCM	Plutonium, Isotopic in Solids
				7396-003	SR		01/06/03	01/20/03	MCM	Total Strontium in Soil
				7396-003	TH		01/07/03	01/20/03	MCM	Thorium, Isotopic in Soil
				7396-003	TP		01/17/03	01/20/03	мсм	Americium 241/Curium in Solids
Method Blank		-	R211088-06	7396-006	U_T		12/19/02	12/21/02	MCM	Uranium, Total in Soil
		SOLID								
	F03-005						·			
Lab Control Sam	mple		R211088-02	7396-002	93A/93		01/07/03	01/20/03	MCM	Gross Alpha in Soil
		SOLID		7396-002	93B/93		01/07/03	01/20/03	MCM	Gross Beta in Soil
	F03-005			7396-002	C		12/24/02	01/20/03	MCM	Carbon 14 in Soil
				7396-002	GAM		01/06/03	01/20/03	MCM	Gamma Scan
				7396-002	NP		01/15/03	01/20/03	MCM	Neptunium in Soil
				7396-002	PU		01/17/03	01/20/03	MCM	Plutonium, Isotopic in Solids
				7396-002	SR		01/06/03	01/20/03	MCM	Total Strontium in Soil
				7396-002	TH		01/07/03	01/20/03	MCM	Thorium, Isotopic in Soil
	····			7396-002	TP		01/17/03	01/20/03	MCM	Americium 241/Curium in Solids
Lab Control Sam	ııple		R211088-05	7396-005	υ_τ		12/19/02	12/21/02	MCM	Uranium, Total in Soil
		SOLID								
	F03-005									

WORK SUMMARY
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SUMMARY DATA SECTION
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SDG 7401 Contact <u>Melissa C. Mannion</u>

WORK SUMMARY, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H1984

CLIENT SAMPLE ID		MATRIX	LAB SAMPLE ID)		SUF-					
CUSTODY	SAF No		RECE I VED	PLANCHET	TEST	FIX	ANALYZED	REVIEWED	BY	METHOD	
Duplicate	(R211101-01)		R211101-02	7401-002	93A/93		01/14/03	01/20/03	MCM	Gross Alpha in Soil	
SP-3		SOLID	11/18/02	7401-002	93B/93		01/07/03	01/20/03	MCM	Gross Beta in Soil	
	F03-005		11/21/02	7401-002	С		12/24/02	01/20/03	MCM	Carbon 14 in Soil	
				7401-002	GAM		01/16/03	01/20/03	MCM	Gamma Scan	
				7401-002	NP		01/15/03	01/20/03	MCM	Neptunium in Soil	
				7401-002	PU		01/15/03	01/20/03	MCM	Plutonium, Isotopic in Solids	
				7401-002	SR		01/06/03	01/20/03	MCM	Total Strontium in Soil	
				7401-002	TH		01/09/03	01/20/03	MCM	Thorium, Isotopic in Soil	
			٠	7401-002	TP		01/17/03	01/20/03	MCM	Americium 241/Curium in Solids	
				7401-002	U_T		12/19/02	12/21/02	MCM	Uranium, Total in Soil	

TEST	SAF No	COUNTS OF	TESTS BY SAIREFERENCE	MPLE TYPE CLIENT MORE	RE BLANK	LCS	DUP SPIKE	TOTAL
93A/93	F03-005	Gross Alpha in Soil	900.0_ALPHABETA_GPC	1	1	1	1	4
938/93	F03-005	Gross Beta in Soil	900.0_ALPHABETA_GPC	1	1	1	1	4
С	F03-005	Carbon 14 in Soil	C14_COX_LSC	1	1	1	1	4
GAM	F03-005	Gamma Scan	GAMMA_GS	1	1	1	1	4
NP	F03-005	Neptunium in Soil	NP237_LLE_PLATE_AEA	1	1	1	1	4
PU	F03-005	Plutonium, Isotopic in Solids	PUISO_PLATE_AEA	1	1	1	1	4
SR	F03-005	Total Strontium in Soil	SRTOT_SEP_PRECIP_GPC	1	1	1	1	4
TH	F03-005	Thorium, Isotopic in Soil	THISO_IE_PLATE_AEA	1	1	1	1	4
TP	F03-005	Americium 241/Curium in Solids	AMCMISO_IE_PLATE_AEA	1	1	1	1	4
U_T	F03-005	Uranium, Total in Soil	UTOT_KPA	1	1	1	1	4
TOTALS				10	10	10	10	40

WORK SUMMARY
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R211088-03

METHOD BLANK

Method Blank

-	7401 Melissa C. Mannion	Client/Case no Contract	SDG_H1984
Lab sample id i		Client sample id Material/Matrix SAF No	SOLID

ANALYTE	CAS NO	RESULT pci/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	-0.368	0.95	2.3	10	Ū	93A
Gross Beta	12587-47-2	-0.624	3.1	5 .5	15	U	93B
Carbon 14	14762-75-5	-2.15	1.8	3.1	50	U	C
Total Strontium	SR-RAD	-0.145	0.16	0.37	1.0	Ū	SR
Thorium 228	14274-82-9	0.037	0.15	0.28		U	TH
Thorium 230	14269-63-7	0.183	0.22	0.28	1.0	υ	TH
Thorium 232	TH-232	0	0.073	0.28	1.0	Ū	TH
Neptunium 237	13994-20-2	-0.033	0.13	0.31	1.0	U	NP
Plutonium 238	13981-16-3	0.062	0.18	0.34	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.031	0.12	0.29	1.0	Ū	PU
Curium 242	15510-73-3	0	0.026	0.057		บ	TP
Curium 243/244	CM-243/244	0.021	0.043	0.075	1.0	บ	TP
Americium 241	14596-10-2	0.047	0.051	0.075	1.0	บ	TP
Sodium 22	13966-32-0	U		0.014		ซ	GAM
Potassium 40	13966-00-2	ប		0.16		Ծ	GAM
Cobalt 60	10198-40-0	U		0.013	0.050	บ	GAM
Antimony 125	14234-35-6	U		0.028		ט	GAM
Tin 126	15832-50-5	Ų		0.017		ט	GAM
Barium 133	13981-41-4	U		0.014		บ	GAM
Cesium 134	13967-70-9	U		0.016		U	GAM
Cesium 137	10045-97-3	บ		0.010	0.10	ט	GAM
Radium 226	13982-63-3	U		0.022		U	GAM
Radium 228	15262-20-1	บ		0.047		บ	GAM
Europium 152	14683-23-9	บ		0.034	0.10	U	GAM
Europium 154	15585-10-1	U		0.043	0.10	ប	GAM
Europium 155	14391-16-3	U		0.027	0.10	U	GAM
Thorium 228	14274-82-9	U		0.016		U	GAM
Thorium 232	TH-232	U		0.047		ប	GAM
Uranium 235	15117-96-1	υ		0.036		Ü	GAM

200 Area Source Chara. 200-CS-1 OU

METHOD BLANKS
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BLANK, cont.

Method Blank

	7401 Melissa C. Mannion	Client/Case no Contract	SDG H1984
Lab sample id Dept sample id		Client sample id Material/Matrix SAF No	 SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pC1/g	QUALI- FIERS	TEST
Uranium 238 Americium 241	U-238 14596-10-2	บ บ	· .	1.4 0.037		บ บ	GAM GAM

200 Area Source Chara. 200-CS-1 OU

QC-BLANK 43470

METHOD BLANKS
Page 2
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R211088-06

METHOD BLANK

Method Blank

	7401 Melissa C. Mannion	Client/Case no Contract	SDG_H1984
	R211088-06 7396-006	Client sample id Material/Matrix SAF No	 SOLID

ANALYTE CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Total Uranium (ug/g) 7440-61-	1 0	0.002	0.005	0.10	U	υ <u></u> Τ

200 Area Source Chara. 200-CS-1 OU

QC-BLANK 43431

METHOD BLANKS
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R211088-02

LAB CONTROL SAMPLE

Lab Control Sample

SDG <u>7401</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> <u>SDG H1984</u> Contract <u>No. 630</u>
Lab sample id <u>R211088-02</u> Dept sample id <u>7396-002</u>	Client sample id <u>Lab Control Sample</u> Material/Matrix <u>SOLID</u> SAF No <u>F03-005</u>

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2ø ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	197	14	3.5	10	_	93A	200	8.0	98	68-132	70-130
Gross Beta	207	11	6.5	15		93B	212	8.5	98	76-124	70-130
Carbon 14	1830	19	4.3	50		c	1910	76	96	84-116	80-120
Total Strontium	22.4	1.2	0.37	1.0		SR	21.2	0.85	106	81-119	80-120
Thorium 230	47.0	9.6	1.2	1.0		TH	40.8	1.6	115	63-137	80-120
Neptunium 237	17.6	2.0	0.36	1.0		NP	19.9	0.80	88	82-118	80-120
Plutonium 238	22.8	2.3	0.21	1.0		PU	24.4	0.98	93	83-117	80-120
Plutonium 239/240	25 .9	2.6	0.21	1.0		PU (26.4	1.1	98	82-118	80-120
Curium 243/244	19.2	0.87	0.11	1.0		TP	18.8	0.75	102	88-112	80-120
Americium 241	18.5	0.85	0.10	1.0		TP	19.1	0.76	97	88-112	80-120
Cobalt 60	1.06	0.075	0.030	0.050		GAM	0.994	0.040	107	73-127	80-120
Cesium 137	1.42	0.074	0.045	0.10		GAM	1.30	0.052	109	73-127	80-120

200 Area Source Chara. 200-C\$-1 OU

QC-LCS 43469			
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Lab id <u>EBRLNE</u>

Protocol <u>Hanford</u>

Version <u>Ver 1.0</u>

Form <u>DVD-LCS</u>

Version <u>3.06</u>

Report date <u>01/20/03</u>

R211088-05

LAB CONTROL SAMPLE

Lab Control Sample

SDG <u>7401</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford SDG H1984</u> Contract <u>No. 630</u>
Lab sample id <u>R211088-05</u> Dept sample id <u>7396-005</u>	Client sample id <u>Lab Control Sample</u> Material/Matrix <u>SOLID</u> SAF No <u>F03-005</u>

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST		2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	
Total Uranium (ug/g)	13.6	1.5	0.045	0.10		U_T	13.2	0.53	103	77-123	80-120

200 Area Source Chara. 200-CS-1 OU

QC-LCS 43430				

LAB CONTROL SAMPLES
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R211101-02

DUPLICATE

B15YP9

	7401		Client/Case no		SDG_H1984
	Melissa C. Mannion	0710144	Contract	NO. 03Ú	
ľ	DUPLICATE	ORIGINAL			
Lab sample id	<u>R211101-02</u> La	sample id <u>R211101-01</u>	Client sample id	B15YP9	
Dept sample id	7401-002 Dep	t sample id <u>7401-001</u>	Location/Matrix		SOLID
		Received <u>11/21/02</u>	Collected/Weight	11/18/02 09:05 961.2	g
% solids	94.3	% solids <u>94.3</u>	Custody/SAF No	F03-005-015 F03-0	<u>05</u>

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3ø PRO1
Gross Alpha	3.16	2.2	2.8	10		93A	2.64	2.1	2.9	U	18	163
Gross Beta	16.2	4.3	5.7	15		93B	15.3	4.7	6.6		6	69
Carbon 14	-0.240	1.8	3.1	50	U	c	1.03	2.4	3.9	Ų	-	
Total Strontium	0.092	0.13	0.25	1.0	U	SR	0.077	0.16	0.32	u	-	
Thorium 228	0.627	0.34	0.32			TH	0.404	0.19	0.15		43	114
Thorium 230	0.914	0.42	0.32	1.0		TH	0.798	0.27	0.34		14	88
Thorium 232	0.249	0.17	0.32	1.0	IJ	TH	0.342	0.15	0.15		31	116
Total Uranium (ug/g)	0.450	0.050	0.005	0.10		U_T	0.457	0.050	0.005		2	30
Neptunium 237	-0.039	0.079	0.30	1.0	U	NP	O	0.073	0.11	ប	•	•
Plutonium 238	0	0.057	0.22	1.0	U	PU]	0	0.051	0.20	U	-	
Plutonium 239/240	0.228	0.17	0.22	1.0		PU	0.077	0.10	0.20	Ų	99	194
Curium 242	0.005	0.019	0.036		U	TP	0.009	0.019	0.036	U	-	
Curium 243/244	0.048	0.037	0.049	1.0	U	TP	-0.004	0.029	0.053	IJ	-	
Americium 241	0.011	0.029	0.040	1.0	U	TP .	0.004	0.036	0.053	U	-	,
Sodium 22	U		0.017		U	GAM	U		0.046	U	-	
Potassium 40	12.5	0.32	0.16			GAM	12.1	0.77	0.40		3	33
Cobalt 60	U		0.016	0.050	U	GAM	U		0.042	U	-	
Antimony 125	U		0.033		U	GAM	U		0.086	U	-	
Tin 126	U		0.21		U	GAM	U		0.097	υ	-	
Barium 133	U		0.013		U	GAM	Ü		0.034	u	-	
Cesium 134	U		0.019		U	GAM	U		0.047	U	-	,
Cesium 137	0.428	0.019	0.018	0.10		GAM	0.428	0.047	0.043		0	36
Radium 226	0.553	0.031	0.030			GAM	0.546	0.077	0.076		1	39
Radium 228	0.788	0.066	0.060			GAM	0.793	0.16	0.14		1	46
Europium 152	U		0.036	0.10	U	GAM	U		0.098	U	-	
Europium 154	U		0.049	0.10	U	GAM	U		0.13	U	-	
Europium 155	υ		0.074	0.10	U	GAM	บ		0.12	U	-	
Thorium 228	0.670	0.019	0.019			GAM	0.688	0.048	0.047		3	34

200 Area Source Chara. 200-CS-1 OU

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R211101-02

DUPLICATE, cont.

B15YP9

SDG 7401		Client/Case no Hanford SDG H19	84
Contact Melissa C. Mannion		Contract No. 630	
DUPLICATE	ORIGINAL		
Lab sample id <u>R211101-02</u>	Lab sample id <u>R211101-01</u>	Client sample id <u>B15YP9</u>	
Dept sample id <u>7401-002</u>	Dept sample id <u>7401-001</u>	Location/Matrix SP-3 SOL	ID
	Received <u>11/21/02</u>	Collected/Weight <u>11/18/02 09:05</u> <u>961.2 g</u>	
% solids <u>94.3</u>	% solids <u>94.3</u>	Custody/SAF No <u>F03-005-015</u> <u>F03-005</u>	

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ PROT TOT LINIT
Thorium 232	0.788	0.066	0.060			GAM	0.793	0.16	0.14		1	46
Uranium 235	IJ		0.063		U	GAM	U		0.16	U	-	
Uranium 238	u		1.7		U	GAM	U		4.5	U	-	
Americium 241	U		0.10		U	GAM	U	_	0.26	U	-	

200 Area Source Chara. 200-CS-1 OU

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Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 01/20/03

Lab id EBRLNE

R211101-01

DATA SHEET

B15YP9

i i	7401 Melissa C. Mannion	Client/Case no Contract		SDG_H1984
		Client sample id Location/Matrix Collected/Weight Custody/SAF No	SP-3 11/18/02 09:05	SOLID 961.2 g F03-005

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	2.64	2.1	2.9	10	Ū	93A
Gross Beta	12587-47-2	15.3	4.7	6.6	15		93B
Carbon 14	14762-75-5	1.03	2.4	3.9	50	บ	С
Total Strontium	SR-RAD	0.077	0.16	0.32	1.0	ប	SR
Thorium 228	14274-82-9	0.404	0.19	0.15			TH
Thorium 230	14269-63-7	0.798	0.27	0.34	1.0		TH
Thorium 232	TH-232	0.342	0.15	0.15	1.0		TH
Total Uranium (ug/g)	7440-61-1	0.457	0.050	0.005	0.10		U_T
Neptunium 237	13994-20-2	0	0.073	0.11	1.0	บ	NP
Plutonium 238	13981-16-3	0	0.051	0.20	1.0	ซ	PU
Plutonium 239/240	PU-239/240	0.077	0.10	0.20	1.0	บ	PU
Curium 242	15510-73-3	0.009	0.019	0.036		บ	TP
Curium 243/244	CM-243/244	-0.004	0.029	0.053	1,0	บ	TP
Americium 241	14596-10-2	0.004	0.036	0.053	1.0	ซ	TP
Sodium 22	13966-32-0	U		0.046		บ	GAM
Potassium 40	13966-00-2	12.1	0.77	0.40			GAM
Cobalt 60	10198-40-0	U		0.042	0.050	บ	GAM
Antimony 125	14234-35-6	ប		0.086		บ	GAM
Tin 126	15832-50-5	U		0.097		ប	GAM
Barium 133	13981-41-4	U		0.034		U	GAM
Cesium 134	13967-70-9	U		0.047		U	GAM
Cesium 137	10045-97-3	0.428	0.047	0.043	0.10		GAM
Radium 226	13982-63-3	0.546	0.077	0.076			GAM
Radium 228	15262-20-1	0.793	0.16	0.14			GAM
Europium 152	14683-23-9	U		0.098	0.10	U	GAM
Europium 154	15585-10-1	U		0.13	0.10	U	GAM
Europium 155	14391-16-3	U		0.12	0.10	Ū	GAM
Thorium 228	14274-82-9	0.688	0.048	0.047			GAM

200 Area Source Chara. 200-CS-1 OU

DATA SHEETS
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R211101-01

DATA SHEET, cont

B15YP9

li e	7401 Melissa C. Mannion	Client/Case no Contract	SDG_H1984
		_	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Thorium 232	TH-232	0.793	0.16	0.14			GAM
Uranium 235	15117-96-1	U		0.16		Ū	GAM
Uranium 238	U-238	U		4.5		ט	GAM
Americium 241	14596-10-2	U		0.26		ט	GAM

200 Area Source Chara. 200-CS-1 OU

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SAMPLE DELIVERY GROUP H1984

Test NP Matrix SOLID
SDG 7401
Contact Melissa C. Mannion

METHOD SUMMARY

NEPTUNIUM IN SOIL
ALPHA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H1984

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUF- TEST FIX	PLANCHET	Neptu 23	m	
Preparation batch 7052-	079					
B15YP9	R211101-01		7401-001	υ		
BLK (QC 1D=43470)	R211088-03		7396-003	U		
LCS (QC ID≈43469)	R211088-02		7396-002	ok		
Duplicate (R211101-01)	R211101-02		7401-002	-	ı	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB Sample		RAW TEST		MDA pCi/g		PREP FAC	DILU-	YIELD %		_	 		PREPARED	ANAL- YZED	DETECTOR
Preparation batch 7052-07	79 2	σ pre	p err	or 5.	.0 %	Reference	Lab	Notebool	7052	pg.	0 79					
B15YP9	R211101	-01			0.11	0.500			61		138		58	01/14/03	01/15	ss-042
BLK (QC ID=43470)	R211088	-03			0.31	0.500			67		138			01/14/03	01/15	SS-024
LCS (QC ID=43469)	R211088	-02			0.36	0.500			64		137			01/14/03	01/15	SS-022
Duplicate (R211101-01) (QC iD=43450)	R211101	-02			0.30	0.500			52		137		58	01/14/03	01/15	SS-043
Nominal values and limits	from m	ethod			1.0	0.500			20-109	;	100	 	180		<u> </u>	

PROCEDURES	REFERENCE	NP237_LLE_PLATE_AEA
1	CP-060	Soil Preparation, rev 4
	CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
	CP-934	Neptunium from Solids and Water by Extraction Chromatography, rev 3

AVERAGES ± 2 SD MDA 0.27 ± 0.22

FOR 4 SAMPLES YIELD 61 ± 13

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Lab id <u>EBRLNE</u>

Protocol <u>Hanford</u>

Version <u>Ver 1.0</u>

Form <u>DVD-CMS</u>

Version <u>3.06</u>

Report date <u>01/20/03</u>

SAMPLE DELIVERY GROUP H1984

Test PU Matrix SOLID

SDG 7401

Contact Melissa C. Mannion

METHOD SUMMARY

PLUTONIUM, ISOTOPIC IN SOLIDS
ALPHA SPECTROSCOPY

Client <u>Hanford</u>
Contract <u>No. 630</u>
Contract <u>SDG H1984</u>

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUF- TEST FIX PLANCHET	Plutonium 238	Plutonium 239/240	
Preparation batch 7052-	079				
B15YP9	R211101-01	7401-001	U	U	
BLK (QC ID=43470)	R211088-03	7396-003	U	U	
LCS (QC ID=43469)	R211088-02	7396-002	ok	ok	
Duplicate (R211101-01)	R211101-02	7401-002	- U	ok	
Nominal values and limi 200 Area Source Chara.		od RDLs (pCi/g)	1.0	1.0	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST		MAX MD pCi/g	A ALIQ	PREP FAC	DILU- TION	YIELD *			• •			PREPARED	ANAL- YZED	DETECTOR
Preparation batch 7052-07	79 2 <i>σ</i> pr	ep err	or 5.0	0 % R	eference	Lab	Not ebook	7052	pg.	079						
B15YP9	R211101-01			0.20	0.500			88		122			59	01/14/03	01/16	ss-056
BLK (QC ID=43470)	R211088-03			0.34	0.500			86		120				01/14/03	01/15	SS-021
LCS (QC ID=43469)	R211088-02			0.21	0.500			89		124				01/14/03	01/17	SS-051
Duplicate (R211101-01) (QC ID=43450)	R211101-02			0.22	0.500			88		120			58	01/14/03	01/15	ss-051
Nominal values and limits	s from metho	d		1.0	0.500			20-105	<u> </u>	100	100	<u> </u>	180			

	PROCEDURES	REFERENCE	PUI SO_PLATE_AEA
ļ		CP-060	Soil Preparation, rev 4
		CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
		CP-941	Plutonium in Water and Dissolved Samples by
			Extraction Chromatography, rev 1
		CP-008	Heavy Element Electroplating, rev 7
			• -•

AVERAGES ± 2 SD MDA 0.24 ± 0.13
FOR 4 SAMPLES YIELD 88 ± 3

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Lab id <u>EBRLNE</u>

Protocol <u>Manford</u>

Version <u>Ver 1.0</u>

Form <u>DVD-CMS</u>

Version <u>3.06</u>

Report date <u>01/20/03</u>

SAMPLE DELIVERY GROUP H1984

Test TH Matrix SOLID

SDG 7401

Contact Melissa C. Mannion

METHOD SUMMARY THORIUM, ISOTOPIC IN SOIL

THORIUM, ISOTOPIC IN SOIL
ALPHA SPECTROSCOPY

Client <u>Hanford</u>
Contract <u>No. 630</u>
Contract <u>SDG H1984</u>

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUF- TEST FIX PLANCHET	Thorium 230
Preparation batch 7052-	079		
B15YP9	R211101-01	7401-001	0.798
BLK (QC ID=43470)	R211088-03	7396-003	U
LCS (QC ID=43469)	R211088-02	7396-002	ok
Duplicate (R211101-01)	R211101-02	7401-002	ok
Nominal values and limi 200 Area Source Chara.		d RDLs (pCi/g)	1.0

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST		X MD: i/g	A ALIQ		DILU-	YIELD %			 DR I FT KeV		PREPARED	ANAL- YZED	DETECTOR
Preparation batch 7052-0	79 2σ pr	ep err	or 5.0 %	R	eference	Lab	Notebool	7052	pg.	079	 	<u> </u>		-	
B15YP9	R211101-01		0	.34	0.250			97		333		58	01/06/03	01/15	SS-042
BLK (QC ID=43470)	R211088-03		0	.28	0.250			103		156			01/06/03	01/07	SS-065
LCS (QC (D=43469)	R211088-02		1	.2_	0.250			26		156			01/06/03	01/07	SS-064
Duplicate (R211101-01) (QC ID=43450)	R211101-02		0	.32	0.250			92		152		52	01/06/03	01/09	SS-040
Nominal values and limits	s from metho	od	1	.0	0.250			20-10	5	150	 	180			

PROCEDURES	REFERENCE CP-060	THISO_IE_PLATE_AEA Soil Preparation, rev 4
į	CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
	CP-907	Thorium in Water and Dissolved Solid Samples by
1		TEVA and Anion Exchange Column Method, rev 2
	CP-008	Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD MDA 0.54 ± 0.89
FOR 4 SAMPLES YIELD 80 ± 72

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Protocol <u>Hanford</u>

Version <u>Ver 1.0</u>

Form <u>DVD-CMS</u>

Version <u>3.06</u>

Report date <u>01/20/03</u>

Lab id EBRLNE

SAMPLE DELIVERY GROUP H1984

Test TP Matrix SOLID

SDG 7401

Contact Melissa C. Mannion

METHOD SUMMARY AMERICIUM 241/CURIUM IN SOLIDS ALPHA SPECTROSCOPY

Client <u>Hanford</u>
Contract <u>No. 630</u>
Contract <u>SDG H1984</u>

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUF- TEST FIX PLANCHET	Curium 243/244	Americium 241	
Preparation batch 7052-	079		-	· · · · · · · · · · · · · · · · · · ·	
B15YP9	R211101-01	7401-001	ប	U	
BLK (QC ID=43470)	R211088-03	7396-003	υ	U	
LCS (QC ID=43469)	R211088-02	7396-002	ok	ok	
Duplicate (R211101-01)	R211101-02	7401-002	- U	- U	
Nominal values and limi 200 Area Source Chara.		d RDLs (pCi/g)	1.0	1.0	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID		SUF- FIX	MAX MDA pCi/g	AL1Q g		DILU-	YIELD %				DR1FT KeV		PREPARED	ANAL- YZED	DETECTOR
Preparation batch 7052-0	79 2σ	orep er	ror 5.	0 % Re	ference	Lab	Notebool	7052	pg.	079						
B15YP9	R211101-0	1		0.053	0.500			79		974			60	01/17/03	01/17	ss-052
BLK (QC ID=43470)	R211088-03	5		0.075	0.500			70		987				01/17/03	01/17	SS-024
LCS (QC ID=43469)	R211088-02	2		0.11	0.500			61		987				01/17/03	01/17	SS-022
Duplicate (R211101-01) (QC ID=43450)	R211101-0	2		0.049	0.500			80		974			60	01/17/03	01/17	ss-055
Nominal values and limit	s from meti	nod		1.0	0.500			20-10	5	100	100		180			· <u> </u>

PROCEDURES	REFERENCE	AMCHISO_IE_PLATE_AEA
	CP-060	Soil Preparation, rev 4
1	CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
	CP-963	Americium and Curium in Water and Dissolved
ľ		Samples by Extraction Chromatography, rev 3
1	CP-008	Heavy Element Electroplating, rev 7

AVERAGES ± 2 SD MDA 0.072 ± 0.056
FOR 4 SAMPLES YIELD 72 ± 18

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SAMPLE DELIVERY GROUP H1984

Test <u>SR</u> Matrix <u>SOLID</u> SDG <u>7401</u> Contact <u>Melissa C. Mannion</u>

METHOD SUMMARY

TOTAL STRONTIUM IN SOIL
BETA COUNTING

Client <u>Hanford</u>
Contract <u>No. 630</u>
Contract <u>SDG H1984</u>

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUF- TEST FIX PLANCHET	Total Strontium	
Preparation batch 7052-	079			
B15YP9	R211101-01	7401-001	U	
BLK (QC ID=43470)	R211088-03	7396-003	U	
LCS (QC ID=43469)	R211088-02	7396-002	ok	
Duplicate (R211101-01)	R211101-02	7401-002	- u	
Nominal values and limi 200 Area Source Chara.		d RDLs (pCi/g)	1.0	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST		- -	PREF	DILU-	YIELD %	EFF %		FWHM keV			PREPARED	ANAL - YZED	DETECTOR
Preparation batch 7052-0	79 2 <i>σ</i> p	rep err	or 10.0 %	Reference	Lab	Notebook	7052	pg.	079						
B15YP9	R211101-01		0.3	2 1.00			92		100			49	01/06/03	01/06	GRB-207
BLK (QC ID=43470)	R211088-03		0.3	7 1.00			76		100				01/06/03	01/06	GRB-202
LCS (QC ID=43469)	R211088-02		0.3	7 1.00			84		60				01/06/03	01/06	GRB-202
Duplicate (R211101-01)	R211101-02		0.2	5 1.00			92		100			49	01/06/03	01/06	GRB-222
(QC ID=43450)															
Nominal values and limit	s from metho	od	1.0	1.00			30-10	5	100		-	180			

PROCEDURES	REFERENCE	SRTOT_SEP_PRECIP_GPC
}	CP-060	Soil Preparation, rev 4
ļ	CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
	CP-502	Strontium in Solids, rev 6

AVERAGES ± 2 SD MDA 0.33 ± 0.11

FOR 4 SAMPLES YIELD 86 ± 15

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SAMPLE DELIVERY GROUP H1984

Test <u>93A</u> Matrix <u>SOLID</u> SDG <u>7401</u> Contact <u>Melissa C. Mannion</u>

METHOD SUMMARY

GROSS ALPHA IN SOIL
GAS PROPORTIONAL COUNTING

Client Hanford
Contract No. 630
Contract SDG H1984

RESULTS

CLIENT SAMPLE ID	SAMPLE ID	RAW SUF	- PLANCHET	Gross Alpha	
Preparation batch 7052-07	79		 -		
B15YP9	R211101-01	93	7401-001	V	
BLK (QC 1D=43470)	R211088-03	93	7396-003	V	
LCS (QC 1D=43469)	R211088-02	93	7396-002	ok	
Duplicate (R211101-01)	R211101-02	93	7401-002	ok	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- MC FIX pCi		PREP FAC	DILU-	RESID mg	EFF %		 		PREPARED	ANAL- YZED	DETECTOR
Preparation batch 7052-0)79 2σpi	rep err	or 20.0 %	Reference	Lab	Notebool	k 7052	pg.	079	 				
B15YP9	R211101-01	93	2.9	0.100			24		100		57	01/06/03	01/14	GRB-116
BLK (QC ID=43470)	R211088-03	93	2.3	0.100			20		107			01/06/03	01/06	GRB-111
LCS (QC ID=43469)	R211088-02	93	3.5	0.100			21		100			01/06/03	01/07	GRB-115
Duplicate (R211101-01) (QC ID=43450)	R211101-02	93	2.6	0.100			25		100		57	01/06/03	01/14	GRB-114
Nominal values and limit	s from metho	od od	10	0.100		·•	5-25	0	100	 	180			

PROCEDURES	REFERENCE	900.0_ALPHABETA_GPC
	CP-060	Soil Preparation, rev 4
	CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
	CP-125	Gross Alpha and Beta in Dissolved Solids, rev 3

AVERAGES ± 2 SD MDA 2.9 ± 0.98

FOR 4 SAMPLES RESIDUE 22 ± 5

METHOD SUMMARIES

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H1984

Test 938 Matrix SOLID
SDG 7401
Contact Melissa C. Mannion

METHOD SUMMARY

GROSS BETA IN SOIL
GAS PROPORTIONAL COUNTING

Client <u>Hanford</u>
Contract <u>No. 630</u>
Contract <u>SDG H1984</u>

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SU	F- X Planchet	Gross Beta
Preparation batch 7052-	079			
B15YP9	R211101-01	93	7401-001	15.3
BLK (QC 1D=43470)	R211088-03	93	7396-003	U
LCS (QC ID=43469)	R211088-02	93	7396-002	ok
Duplicate (R211101-01)	R211101-02	93	7401-002	ok

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST				DILU-	RESID mg	EFF %		FWHM keV		PREPARED	ANAL- YZED	DETECTOR
Preparation batch 7052-0	179 2 <i>σ</i> pr	ep err	or 15.0 %	Reference	Lab	Notebook	7052	pg.	079					
B15YP9	R211101-01	93	6.6	0,100			24		100		50	01/06/03	01/07	GRB-105
BLK (QC ID=43470)	R211088-03	93	5.5	0.100			20		107			01/06/03	01/06	GRB-111
LCS (QC ID=43469)	R211088-02	93	6,5	0.100			21		100			01/06/03	01/07	GRB-115
Duplicate (R211101-01) (QC ID=43450)	R211101-02	93	5.7	0.100			25		100		50	01/06/03	01/07	GR8-102
Nominal values and limit	s from metho	xd	15	0.100			5-250		100		 180			

PROCEDURES	REFERENCE	900.0_ALPHABETA_GPC
j	CP-060	Soil Preparation, rev 4
	CP-071	Soil Dissolution, > 1.0g Aliquot, rev 2
	CP-125	Gross Alpha and Beta in Dissolved Solids, rev 3

AVERAGES ± 2 SD MDA 6.1 ± 1.1

FOR 4 SAMPLES RESIDUE 22 ± 5

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SAMPLE DELIVERY GROUP H1984

Test GAM Matrix SOLID
SDG 7401
Contact Melissa C. Mannion

METHOD SUMMARY

GAMMA SCAN
GAMMA SPECTROSCOPY

Contract No. 630
Contract SDG H1984

RESULTS

CLIENT SAMPLE ID	SAMPLE ID	RAW SUF-		Cobalt	60	Cesium 137	
Preparation batch 7052-	079						
B15YP9	R211101-01		7401-001	U		0.428	
BLK (QC ID=43470)	R211088-03		7396-003	U		U	
LCS (QC ID=43469)	R211088-02		7396-002	ok		ok	
Ouplicate (R211101-01)	R211101-02		7401-002	-	u	ok	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SU TEST FI		AL IQ g		DILU-		EFF %		 		PREPARED	ANAL - YZED	DETECTOR
Preparation batch 7052-0	79 2 <i>ø</i> pr	ер еггог	15.0 % Re	eference	Lab N	loteboo	k 7052	pg.	079					
B15YP9	R211101-01		0.33	803					112		58	01/02/03	01/15	MB,05,00
BLK (QC ID=43470)	R211088-03		0.12	719					99			01/02/03	01/06	01,04,00
LCS (QC ID=43469)	R211088-02		0.030	719					101			01/02/03	01/06	MB,05,00
Duplicate (R211101-01) (QC ID=43450)	R211101-02		0.21	803					722		59	01/02/03	01/16	MB,05,00
Nominal values and limit	s from metho	d	0.050	719					100	 	180		,,,,	

PROCEDURES		GAMMA_GS
1	CP-060	Soil Preparation, rev 4
}	CP-100	Ge(Li) Preparation for Commercial Samples, rev 5

AVERAGES ± 2 SD MOA ______ ± _____ ± _____ FOR 4 SAMPLES YIELD _____ ± _____

METHOD SUMMARIES
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SAMPLE DELIVERY GROUP H1984

Test <u>U T Matrix SOLID</u>
SDG 7401
Contact <u>Melissa C. Mannion</u>

METHOD SUMMARY

URANIUM, TOTAL IN SOIL KINETIC PHOSPHORIMETRY Client <u>Hanford</u>
Contract <u>No. 630</u>
Contract <u>SDG K1984</u>

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUF- TEST FIX PLANCHET	Total Uranium	
Preparation batch 7052-0	079			
315YP9	R211101-01	7401-001	0.457	•
3LK (QC ID=43431)	R211088-06	7396-006	U	
_CS (QC ID=43430)	R211088-05	7396-005	ok	
Ouplicate (R211101-01)	R211101-02	7401-002	ok	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB Sample	ID	RAW TEST		MDA ug/g			P DILU-	YIELD %			FWHM keV	 	PREPARED	ANAL~ YZED	DETECTOR
Preparation batch 7052-0	79 ;	2σ pr	ep er	ror 9.	0 %	Reference	Lab	Notebool	c 7052	pg.	079					
B15YP9	R21110	1-01			0.00	5 0.100							31	12/19/02	12/19	KPA-001
BLK (QC ID=43431)	R21108	3-06			0.00	5 0.100								12/19/02	12/19	KPA-001
LCS (QC ID=43430)	R211088	3-05			0.04	5 0.100								12/19/02	12/19	KPA-001
Duplicate (R211101-01) (QC 1D=43450)	R21110	1-02			0.00	5 0.100							31	12/19/02	12/19	KPA-001
Nominal values and limit	s from 1	netho	xd		0.10	0.100			. <u>. </u>				 180			

I	PROCEDURES	REFERENCE	UTOT_KPA
l		CP-060	Soil Preparation, rev 4
I		CP-070	Soil Dissolution, < 1.0g Aliquot, rev 5
		CP-044	Sample Preparation for Total Uranium by Kinetic
I			Phosphorimetry, rev 4
١	1	CP-928	Total Uranium by Kinetic Phosphorimetry, rev 5
ı			

AVERAGES ± 2 SD MDA 0.015 ± 0.040
FOR 4 SAMPLES YIELD ±

METHOD SUMMARIES
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SAMPLE DELIVERY GROUP H1984

Test	C Matrix SOLID
SDG	7401
Contact	Melissa C. Mannion

METHOD SUMMARY

CARBON 14 IN SOIL
LIQUID SCINTILLATION COUNTING

Client <u>Hanford</u>
Contract <u>No. 630</u>
Contract <u>SDG_H1984</u>

RESULTS

CLIENT SAMPLE ID	LAB Sample ID	RAW SUF- TEST FIX	PLANCHET	Carbo	1 14	
Preparation batch 7052-	07 9	<u> </u>				
B15YP9	R211101-01		7401-001	u		
BLK (QC ID=43470)	R211088-03		7396-003	U		
LCS (QC 1D=43469)	R211088-02		7396-002	ok		
Duplicate (R211101-01)	R211101-02		7401-002	-	U	

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB Sample	ID	RAW TEST		MDA pCi/g		PREP FAC	DILU-	YIELD %			 		PREPARED	ANAL- YZED	DETECTOR
Preparation batch 7052-07	79 2	σ pr	ep eri	ror 1	0.0 %	Reference	Lab	Notebook	7052	pg.	079	 		····		
B15YP9	R211101	-01			3.9	0.242			100		100		36	12/23/02	12/24	LSC-006
BLK (QC ID=43470)	R211088	-03			3.1	0.334			100		100			12/23/02	12/23	LSC-006
LCS (QC ID=43469)	R211088	-02			4.3	0.334			100		44			12/23/02	12/24	LSC-006
Duplicate (R211101-01) (QC ID=43450)	R211101	-02			3.1	0.312			100		100		36	12/23/02	12/24	LSC-006
Nominal values and limits	s from m	etho	d		50	0.334					50		180			· · · · · ·

PROCEDURES	REFERENCE	C14_COX_LSC
	CP-251	Tritium/Carbon-14 Oxidation, rev 5

AVERAGES ± 2 SD	MDA	3.6	ŧ	1.2 0
FOR 4 SAMPLES	YIELD	100	ŧ	

METHOD SUMMARIES
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SUMMARY DATA SECTION
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Lab id <u>EBRLNE</u>

Protocol <u>Hanford</u>

Version <u>Ver 1.0</u>

Form <u>DVD-CMS</u>

Version <u>3.06</u>

Report date <u>01/20/03</u>

SAMPLE DELIVERY GROUP H1984

SDG 7401
Contact Melissa C. Mannion

REPORT GUIDE

Client	Hani	ford	
Contract	No.	630	
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SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- * LAB SAMPLE ID is the lab's primary identification for a sample.
- * DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- * CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- * QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.
 - QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.
- * All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

REPORT GUIDES

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0

Form <u>DVD-RG</u> Version <u>3.06</u>

Report date <u>01/20/03</u>

SAMPLE DELIVERY GROUP H1984

SDG 7401
Contact Melissa C. Mannion

REPORT GUIDE

Client	Hani	ford	_
Contract	No.	630	_
Case no	SDG	H1984	

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- * The preparation batches are shown in the same order as the Method Summary Reports are printed.
- * Only analyses of planchets relevant to the SDG are included.
- * Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- * The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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SAMPLE DELIVERY GROUP H1984

SDG 7401
Contact Melissa C. Mannion

REPORT GUIDE

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WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- * TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- * SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- * The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- * PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- * For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- * The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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SAMPLE DELIVERY GROUP H1984

SDG 7401
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REPORT GUIDE

Clie	nt	Hani	ford	
Contra	ct	No.	630	
Case	no	SDG	H1984	

DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- * TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- * The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- * ERRORs can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- * A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- * When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

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SAMPLE DELIVERY GROUP H1984

SDG 7401
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GUIDE, cont.

Client	Hani	Ford	
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Case no	SDG	H1984	

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

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SAMPLE DELIVERY GROUP H1984

SDG <u>7401</u> Contact <u>Melissa C. Mannion</u>

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Client	Han	ford	
Contract	No.	630	
Case no	SDG	H1984	

DATA SHEET

- * An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- * A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- * When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06

Report date 01/20/03

SAMPLE DELIVERY GROUP H1984

SDG <u>7401</u> Contact <u>Melissa C. Mannion</u>

REPORT GUIDE

Client	Hani	Ford_	
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Case no			

LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- * An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- * REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- * The first, computed limits for the recovery reflect:
 - 1. The error of RESULT, including that introduced by rounding the result prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

- 2. The error of ADDED.
- 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- * The second limits are protocol defined upper and lower QC limits for the recovery.
- * The recovery is underlined if it is outside either of these ranges.

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/20/03

SAMPLE DELIVERY GROUP H1984

SDG <u>7401</u> Contact <u>Melissa C. Mannion</u>

REPORT GUIDE

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DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTs prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- * The second limit for the RPD is the larger of:
 - 1. A fixed percentage specified in the protocol.

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0

Form <u>DVD-RG</u> Version <u>3.06</u>

Report date <u>01/20/03</u>

SAMPLE DELIVERY GROUP H1984

SDG 7401
Contact Melissa C. Mannion

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DUPLICATE

- 2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.
- * The RPD is underlined if it is greater than either limit.
- * If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
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Report date 01/20/03

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Client	Hani	Ford	
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MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.
 - If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.
- * An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.
 - An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.
- * REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.
- * The first, computed limits for the recovery reflect:
 - 1. The errors of the two RESULTs, including those introduced by rounding them prior to printing.
 - If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
 - 2. The error of ADDED.
 - 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- * The second limits are protocol defined upper and lower QC limits

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG

Version 3.06

Report date 01/20/03

SAMPLE DELIVERY GROUP H1984

SDG 7401 Contact Melissa C. Mannion

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MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

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SUMMARY DATA SECTION
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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/20/03

SAMPLE DELIVERY GROUP H1984

SDG 7401 Contact <u>Melissa C. Mannion</u>

REPORT GUIDE

Client <u>Hanford</u>
Contract <u>No. 630</u>
Case no <u>SDG H1984</u>

METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- * Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- * Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG

Version 3.06

Report date <u>01/20/03</u>

SAMPLE DELIVERY GROUP H1984

SDG 7401 Contact Melissa C. Mannion

GUIDE, cont.

Client	Han	ford	
Contract	No.	630	
Case no	SDG	H1984	

METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- * Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- * If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- * Aliquots are underlined if less than the nominal value specified for the method.
- * Prepareation factors are underlined if greater than the nominal value specified for the method.
- * Dilution factors are underlined if greater than the nominal value specified for the method.
- * Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- * Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- * Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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Lab id EBRLNE
Protocol Hanford

Version Ver 1.0

Form <u>DVD-RG</u>

Version <u>3.06</u>

Report date <u>01/20/03</u>

SAMPLE DELIVERY GROUP H1984

SDG 7401
Contact Melissa C. Mannion

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Client	Hani	ford	
Contract	No.	630	
Case no	SDG	H1984	

METHOD SUMMARY

- * Count times are underlined if less than the nominal value specified for the method.
- * Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- * Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- * Days Held are underlined if greater than the holding time specified in the protocol.
- * Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1÷3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

REPORT GUIDES
Page 14
SUMMARY DATA SECTION
Page 40

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/20/03

SAMPLE DELIVERY GROUP H1984

SDG 7401
Contact Melissa C. Mannion

GUIDE, cont.

Clie	ent	Hanf	ford	 	
Contra	act	No.	630		
Case	no	SDG	H1984		

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

REPORT GUIDES
Page 15
SUMMARY DATA SECTION
Page 41

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>

Form DVD-RG

Version 3.06
Report date 01/20/03

FLUOR Hanfo	rd Inc.	C	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST F03-005-015 Page 1 of 1					of 7						
Collector R. Nielson)		any Contact ve Trent	Telepho 373-5				Project Coordinator TRENT, SJ		rice Code	8N	Data Tur	į.	
Project Designation 200 Area Source Characteriza	ation 200-CS-1 QU - Wast		Man SP-3 H/984			7401)		SAF No. F03-005	A	ir Quality		451	45 Days	
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Shipped To CONTROL OF SERVICES (For	A Das	Offsite	e Property No.	030	056			Bill of Lading/	Air Bill No	See	051	PC		
POSSIBLE SAMPLE HAZA	rds/remarks EB		Preservation	Cool	Cool 4	C Cool 4C	Cool 4	IC None	None	None	None	None		
C 2,000 PC	•	4/2010-	Type of Container	G	70	6	aG	G/P	G/P	G/P	G/P	G/P		
Special Danding and of	ow age		No. of Container(s)	1	1	Ţ	1	1	1	1	1	1		
			Volume	60g	2508		250		500g	60g	1000g See item (4) in	500g		
	SAMPLE ANALY	rsis e		VOA - 8260/ (TCL)	A See item (Specia Impruetic	Glycols, & Ketones - 8015M (Add- on) (1- Proposol,	PCBs-1	See Heart (2) Hi Special Interpretions.	See item (3) in Special Instructions.	pH (Soil) - 9045	Special Special Instructions.	Nickel-63; Technetium- 99; Thium -) 8102-	
Sample No.	Matrix *	Sample Date	Sample Time			Ethanol)								
B15YP9	SOIL	11-18-0:	2 0905	X	Х	Х	Х		X	X	X			
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FINAL SAMPLE Disposal M DISPOSITION	fethod	<u> </u>		<u> </u>		Disp	osed By					Date/Time	- <u></u>	
2.01.001.101.1	<u>.</u>													

Richmond, CA Laboratory

SAMPLE RECEIPT CHECKLIST

<u> </u>	SAMPLE RECEIPT
Client:	Fhor Manford Date/Time received 1/21/32 9:50 Am
CoC N	o. F03-005-015
1	ner I.D. No. ERC 9 6 059 Requested TAT (Days) 4도 P.O. Received Yes [] No []
	INSPECTION
1.	Custody seals on shipping container intact? Yes 🔀] No [] N/A []
2.	Custody seals on shipping container dated & signed? Yes [] No [] N/A []
3.	Custody seals on sample containers intact? Yes [>] No [] N/A []
4.	Custody seals on sample containers dated & signed? Yes [>] No [] N/A []
5.	Packing material is: Wet [] Dry [X]
6.	Number of samples in shipping container:
7.	Number of containers per sample: (Or see CoC)
8.	Paperwork agrees with samples? Yes Yes No []
9.	Samples have: Tape [] Hazard labels [] Rad labels [] Appropriate sample labels
10.	Samples are: In good condition [X] Leaking [] Broken Container [] Missing []
11.	Describe any anomalies:
	none
13.	Was P.M. notified of any anomalies? Yes [] No [] Date
14.	Received by Date: 11/21/04 Time: 9.50 Am
Custom	er Sample Customer Sample
	No. cpm mr/hr wipe No. cpm mr/hr wipe
Ion Chai	mber Ser. No Calibration data
	eter Ser. No Calibration date
Survey !	Meter Ser. No Calibration date



2 January 2003

Mr. Steve Trent Fluor Hanford Inc. 825 Jadwin Ave. Richland, WA 99352

Subject: Contract No. 630
Analytical Data Package

Dear Mr. Trent:



Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLI Batch #	0211L201
SDG #	H1984
SAF#	F03-005
Date Received	11-21-02
# Samples	1
Matrix	Soil
Volatiles	Х
Semivolatiles	Χ
Pest/PCB	X
DRO/GRO	X
GC Scan	X
Metals	X
Inorganics	Χ

The electronic data deliverable (EDD) will be emailed shortly. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

Lionville Laboratory Incorporated

Orlette S. Johnson Project Manager

r:\group\pm\orlette\tnu-hanford\data\fc_ltrs.doc

Lionville Laboratory, Inc. VOA ANALYTICAL DATA PACKAGE FOR TNUHANFORD FO3-005 H1984

DATE RECEIVED: 11/21/02

LVL LOT # :0211L201

CLIENT ID	LVL	#	мтх	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
							
B15YP9	001		s	02LVX660	11/18/02	N/A	11/25/02
B15YP9	001	MS	s	02LVX660	11/18/02	N/A	11/25/02
B15YP9	001	MSD	s	02LVX660	11/18/02	n/a	11/25/02
LAB QC:							
VBLKAE	MB1		s	02LVX660	N/A	n/A	11/25/02
VBLKAR	MB1	BS	S	02LVX660	N/A	N/A	11/25/02

ه لا دواهم





Client: TNU-HANFORD F03-005

LVL #: 0211L201

SDG/SAF #: H1984/F03-005

W.O. #: 11343-606-001-9999-00 **Date Received:** 11-21-2002

GC/MS VOLATILE

One (1) soil sample was collected on 11-18-2002.

The sample and its associated QC samples were analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8260B for TCL volatile target compounds on 11-25-2002.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. All results presented in this report are derived from a sample that met LvLI's sample acceptance policy.
- 2. The required holding time for analysis was met.
- 3. A non-target compound was detected in the sample.
- 4. All surrogate recoveries were within EPA OC limits.
- 5. All matrix spike recoveries were within EPA QC limits.
- 6. All blank spike recoveries were within EPA OC limits.
- 7. Internal standard area and retention time criteria were met.
- 8. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
- 9. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

President

Lionville Laboratory Incorporated

som\group\data\voa\tnu-hanford\0211-201.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 2 pages. 02

GLOSSARY OF VOA DATA

DATA QUALIFIERS

- Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D = Identifies all compounds identified in an analysis at a secondary dilution factor.
- 1 = Interference.
- NO = Result qualitatively confirmed but not able to quantify.
- Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y = Additional qualifiers used as required are explained in the case narrative.



2

GLOSSARY OF VOA DATA

ABBREVIATIONS

BS	*	Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions
		and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Suffix added to sample number to indicate that results are from a diluted analysis.

NA = Not Applicable.

DF - Dilution Factor.

NR - Not Required.

SP, Z = Indicates Spiked Compound.



TECHNICAL FLAGS FOR MANUAL INTEGRATION

Manual quantitation modifications or integrations are performed routinely to improve the data quality for a variety of technical reasons. Documentation of these modifications should be clear and concise. The following "flags" are used to indicate the technical reasons for quantitation modifications:

- MP Missed Peak: manually added peak not found by automatic quantitation program.
- PA Peak Assignment: quantitation report was changed to reflect correct peak assignment.
- RI Routine Integration: routine integrations are performed for some analytes that are consistently integrated improperly by the automatic integration programs. Examples are the dichlorobenzene isomers on the VOA packed column and benzo(b)fluoranthene/benzo(k)fluoranthene which are poorly resolved on the BNA column.
- SP Split Peak: the automatic integration improperly split the peak; a manual integration was performed to get the correct area.
- CB Coelution/Background: peak was manually integrated to eliminate contribution from coeluting compounds, background signal, or other interference.
- PI Proper Integration: a peak with poor or inconsistent integration (e.g., excessive tail) was properly integrated manually.



L-W1-035/a-mi-10/00

Lionville Laboratory, Inc.

Volatiles by GC/MS, HSL List

Report Date: 12/11/02 15:36 Client: TNUHANFORD FO3-005 H1984 Work Order: 11343606001 Page: 1a RFW Batch Number: 0211L201

	Cust ID:	B15YP	9	B15YP	9	B15YP9	•	VBLKAE		VBLKAE BS	
Sample	RFW#:	001	L	001 MS	3	001 MSI)	02LVX660-B	1B1	02LVX660-M	B1
Information	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.0	06	1.0	00	1.1	11	1.0	00	1.0	0
	Units:	ug/I	ζq	սց/յ		ug/k		ug/I	_	ug/K	
					-		_	٥,	_	-3,	
	Toluene-d8	112	ક	110	8	116	*	108	*	105	8
_	mofluorobenzene	100	¥	98	*	104	ક્ષ	102	왐	99	*
	chloroethane-d4	86	ક્ષ	85	옿	88	윰	89	ક	86	४
										==========	=fl=======fl
Chloromethane			U	11		12	U	10		10	U
Bromomethane					U		ט	10	_	10	U
Vinyl Chloride		11			U		U	10	-	10	ט
Chloroethane		11	Ū		U		U	10	U	10	U
Methylene Chloride		7		2		2	J	5	U	5	ប
Acetone		11	Ü		Ü		U	10	U	10	υ
carbon pisuilide		6	Ū	_	U	6	Ü	5	U	5	υ
1,1-Dichloroethene			U	98	*	97	¥	5	U	82	*
1,1-Dichloroethane		6	U	6	U	6	U	5	U	5	U
1,2-Dichloroethene		6	Ū	6	U	6	U	5	Ū	5	U
Chloroform		6	ŋ	6	U	6	U	5	σ	5	υ
1,2-Dichloroethane		6	υ	6	U	6	U	5	U	5	ប
2-Butanone		11	Ū	11	-	12	U	10	U	10	ប
1,1,1-Trichloroeth	ane	6	U	6	U	6	U	5	U	5	ט
Carbon Tetrachlori	de	6	U	. 6	บ	6	U	5	U	5	ប
Bromodichlorometha	ne	6	U	6	Ü	6	U	5	U	5	υ
1,2-Dichloropropan	e	6	U	6	U	6	U	5	U	5	ប
cis-1,3-Dichloropr	opene	6	U	6	U	6	U	5	U	5	Ŭ
Trichloroethene_		6	U	114	*	117	∛	5	U	104	४
Dibromochlorometha	ne	6	U	6	U	6	U	5	U	5	U
1,1,2-Trichloroeth		6	υ	6	U	6	U	5	U	5	Ŭ
Benzene		6	U	112	૪	115	왐	5	Ü	100	ર્
Trans-1,3-Dichloro	propene	6	U	6	U	6	U	5	Ų	5	U
Bromoform		6	U	6	Ū	6	U	5	Ü	5	ប
4-Metnyl-2-pentano	ne	11	U		U	12	Ū	10	U	10	U
2-Hexanone		11	U	11	U	12	U	10	U	10	U
Tetrachloroethene_		6	Ω	6	U	6	U	5	U	5	U
1,1,2,2-Tetrachlor	oethane	6	U	6	U	6	U	5	U	5	U
Toluene		6	U	112	*	115	옿	5	U	100	8
+ 0	OT D. OO. 3 imiles										

^{*=} Outside of EPA CLP QC limits.

RFW Batch Number: 0211L201	Client	: TNUHA	NFORD	FO3-005	H198	4 Work C	rde	r: 11343606	001	Page: 1b		
Cu	ist ID:	B15YP9		B15YP9		B15YP9	1	VBLKAE		VBLKAE BS		<i>t</i>
	RFW#:	001		001 MS		001 MSD	•	02LVX660-M	В1	02LVX660-M	B 1	
Chlorobenzene		6	U	104	%	110	- }	5	U	97	8	
Ethylbenzene		6	U	6	U	6	U	5	U	5	U	
Styrene		. 6	Ü	6	U	6	ប	5	U	5	U	
<pre>Xylene (total) *= Outside of EPA CLP QC li</pre>	mits.	1	J	1	J	6	U	.5	Ū	5	U	

VOLATILE ORGANICS ANALYSIS SHEET TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

,			
	B15YP9		

CLIENT SAMPLE NO.

Client: TNUHANFORD F03-005 H1984

SOIL Matrix:

Lab Sample ID: 0211L201-001

Sample wt/vol: 4.70 (g/mL) G

Lab File ID: <u>x112509</u>

Level: (low/med) LOW

Date Received: 11/21/02

% Moisture: not dec. ____5

Date Analyzed: 11/25/02

Column: (pack/cap) CAP

Dilution Factor: 1.06

CONCENTRATION UNITS:

Number TICs found: 1

(ug/L or ug/Kg) ug/Kg

- [[]
	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	*****		======	E========	====
	1.	SILOXANE	17.558	6	J

1E

VOLATILE ORGANICS ANALYSIS SHEET TENTATIVELY IDENTIFIED COMPOUNDS

l		
 1751 12 15 15		

CLIENT SAMPLE NO.

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD F03-005 H1984

Matrix: SOIL

Lab Sample ID: 02LVX660-MB1

Sample wt/vol: 5.00 (g/mL) G Lab File ID: x112505

Level: (low/med) LOW

Date Received: 11/25/02

% Moisture: not dec. ___0

Date Analyzed: <u>11/25/02</u>

Column: (pack/cap) CAP

Dilution Factor: 1.00

CONCENTRATION UNITS:

Number TICs found: 0

(ug/L or ug/Kg) ug/Kg___

1			Ĭ		·
ĺ	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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Lionville Labo	ratory	Use Only		usto	dy T	rans	sfe	r F	?ecc	ord/L	.ab \	No	rk	не	qu	es	l Pa	ge <u>'</u>	01					V	J	ı
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FLUOR Hanford Inc.	CH	IAIN OF CUST	ODY/S	AM	PLE	ANALY	SIS	RE	QUEST		F03	-005-0)15	Page 1	of 1
Collector R. Nielson	Compa	ny Contact Trent	Telephor 373-58	ne No.				Pro	iect Coordin ENT, SJ	stor	Price Code	8N			rnarouad
Project Designation 200 Area Source Characterization 200-CS-1 OU - Waste Man	Sampli SP-3	ng Location							7 No. -005		ir Quality			45	Days
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Shipped To RECRA DAS EDERLINE SERVICES (Formerly TMA) "/20/82			300	4:	 ₹			Bin	of Lading/A	ir Bill N	a 51.	<u> </u>	25/ 50	lo d	
POSSIBLE SAMPLE HAZARDS/REMARKS	1		1	7								NY	7	1	
6 2,000 pCi/sm		Preservation	Cool 4C	Co	ol 4C	Coal 4C	Cool	4C	None	None	None	N.	ne /	None	
Special Handling and/or Storage	:	Type of Container	G	<u> </u>	•G	G	#G		G/P	G/P	G/P	\prod_{c}	<u> </u>	G/P	
		No. of Container(s)	1 60g		1 50g	1 60g	250		1 125g	500g	60g	10		500k	
		Volume											<u>Y</u>		
SAMPLE ANALYSIS			VOA - \$260A (TCL)	Sp	om (1) in recial vezions.	Alcohols, Glycols, & Ketoner - 2015M (Add- on) {1- Propunol, Ethanol}	PCBs -	. 2062	See item (2) in Special Instructions.	See item (3) Special Instruction	9045	See iter Spe Instru	(4) in tis cticum.	Nickel-63; Technetium- 99; Tritium - 13 C.)	8/02
Sample No. Matrix * Sam	pie Date	Sample Time				1						$\ \cdot\ $			
B15YP9 SOIL	18-0%	2 0905	X		X	Х	×	(X	X	X	1/ /			
				 _								<u> </u>		·	ļ
			<u> </u>								Personnel no				
			<u> </u>								relinquish sa: Ref# <u>{</u>				ļ
			l	1_					<u> </u>			1		L	
	Sign/Prin				SPEC	TAL INSTR	UCTIO	ONS							Matrix *
Refinquished By/Removed From Date/Time Recei 3728 L. + 1 A 11 20 02 1100	ved By/Stor	1A 13728 11-18-19 John 1120	nte/Time		(1) S (2) IC	emi-VOA — 82 CP Metals - 601 Aetals - 6010A :	70A (Ad 10A (Suj (Superir	dd-On) pertrac race Ad) (Tributy! pho- ce) (Arsenic, B. dd-Ou) (Alumi	sphate}; TP arium, Cada num, Beryil	'H-Diesel Range mium, Chromiun lium, Bismuth, B m, Sodium, Tha	ı, Lead, : oron, Ca	Seleniu Icium,	Соррег,	S-Soil SE-Soilment SO-Soild SI-Sindge W = Water O-Oil A-Air
DE LASTIDEN ERC	ved By/Stor	-l-	ate/Time	!	Merci	ury - 7471 - (C\ C Anione - 300 (V); Chro	omium cide. F	Hex - 7196 Juoride, Nitrate	. Nitrite. Pl	nosobate. Sulfate): NO2/	NO3 - :	353.2;	DS-Drum Solida DL-Drum Liquids
Relinquished By/Removed From Date/Time Recei	PED		<u> 02 4 (</u> ste/Time		Ann	oma - 350.3; Su	ifides -	9030,	Total Cyanide	9010	.127 Cabalt.60	Furnois	m_152	Francium.	T=Times WI=Wips
Hea 6x 11-21-02 0945	Minus 11:21	02 0	945	L (4) U 154, I	ross Alpini; Or Europium-155);	Garan	s Spec	: - Add-on (Am	ericium-24	1, Antimony-125	, Barium	-133, (esium-134,	L=Liquid V=Veganies	
	ved By/Stof	ed.lj) Dr	Lector	nn-226, Radium pic Uranium; St Americium-241/	rontitim-	-89,90	Total Sr; Ca	rbon-14; No	stonium; Isotopic eptunium-237; T	otal Urai	n (1100) nium; A	num-232); mericium-	X=Other		
Relinquished By/Removed From Date/Time Recei	ved By/Stor	ed in Di	ate/Time		243,7	THE ROLL OF THE PARTY OF THE PA			-	, 					<u> </u>
LABORATORY Received By SECTION			Ti	tic									D	ate/Time	
FINAL SAMPLE Disposal Method DISPOSITION						Dispos	ed By						Г	Pate/Time	

LIONVILLE LABORATORY INCORPORATED

SAMPLE RECEIPT CHECKLIST

Purchase Order/Project:

DATE: 11-21-02

SAF#) SOW#/Release #: FO3-005

Laboratory SDG #:

Laborate	ory SDG #: () ろいしるの				. •
NOTE:	ALL ENTRIES MARKED "NO" MUST BE E	XPLAINED II	THE COMM	ENT SECTION	1
1.	Custody seals on coolers or shipping container intact, signed and dated?	S) Yes	D No	□ N/A	see Comment #
2.	Outside of coolers or shipping containers are free from damage?	YChYes	D No	□ N/A	☐ see Comment#
3.	Airbill # recorded?	ty Yes	□ No	CI N/A	☐ see Comment #
4.	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	Q Yes	U No	O N/A	CI see Comment #
5.	Sample containers are intact?	150Yes	□ No	D N/A	🗆 see Comment #
6.	Custody seals on sample containers intact, signed and dated?	. □ Yes	□ No	□ N/A	☐ see Comment #
7.	All samples on coc received?	D Yes	□ No	□ N/A	see Comment #
8.	All sample label information matches coc?	Yes Yes	□ No	□ N/A··	☐ see Comment #
9.	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	Yes	□ No	□ N/A	🖸 see Comment #
10.	Shipment meets LvLl Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	Yes	□ No	□ N/A	☐ see Comment #
11.	Where applicable, bar code labels are affixed to coc?	C Yes	□ No	DINIA	🖸 see Comment #
12	. coc signed and dated?	Yes	□ No	D N/A	See Comment #
13	. coc will be faxed or emailed to client?	Yes	□ No	□ N/A	see Comment #
14	. Project Manager/Client contacted concerning discrepancies? (name/date)	☐ Yes	□ No	BNA	See Comment #

Cooler # / temp (°C) and Comments:

Elc. 99.030/ 1.2"

Laboratory Sample Custodian:

Laboratory Project Manager:

Lionville Laboratory, Inc. BNA ANALYTICAL DATA PACKAGE FOR TNUHANFORD FO3-005 H1984

DATE RECEIVED: 11/21/02 LVL LOT # :0211L201

CLIENT ID	LVL	#	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
				 _			·
B15YP9	001		s	02LE1401	11/18/02	11/22/02	12/05/02
B15YP9	001	MS	S	02LE1401	11/18/02	11/22/02	12/06/02
B15YP9	001	MSD	S	02LE1401	11/18/02	11/22/02	12/06/02
LAB QC:							
							
SBLKIQ	MB1		s	02LE1401	N/A	11/22/02	12/05/20
SBLKIQ	MB1	BS	S	02LE1401	N/A	11/22/02	12/05/02
SBLKIQ	MB1	BSD	S	02LE1401	N/A	11/22/02	12/05/02





Client: TNU-HANFORD F03-005

LVL#: 0211L201

SDG/SAF #: H1984/F03-005

W.O. #: 11343-606-001-9999-00 **Date Received:** 11-21-2002

SEMIVOLATILE

One (1) soil sample was collected on 11-18-2002.

The sample and its associated QC samples were extracted according to Lionville Laboratory OPs based on method 3550 on 11-22-2002 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for client specified Semivolatile target compounds on 12-05,06-2002.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. All results presented in this report are derived from a sample that met LvLI's sample acceptance policy.
- 2. The sample was extracted and analyzed within required holding time.
- 3. Non-target compounds were detected in the sample.
- 4. All surrogate recoveries were within EPA QC limits.
- 5. Two (2) of twenty-two (22) matrix spike recoveries were outside EPA QC limits.
- 6. All blank spike recoveries were within EPA QC limits.
- 7. Internal standard area criteria were not met for the blank spike 02LE1401-MB1 BS. However; the GC/MS instrument was inspected for possible malfunction and was judged to be functioning properly.
- 8. Manual integrations are performed according to OP 21-06A-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
- 9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor

Date

President

Lionville Laboratory Incorporated

West

som\gorup\data\bna\tnu-hanford-0211-201.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 2 pages.

GLOSSARY OF BNA DATA

DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I = Interference.
- NQ = Result qualitatively confirmed but not able to quantify.
- A = Indicates that a TIC is a suspected aldol-condensation product.
- N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y = Additional qualifiers used as required are explained in the case narrative.



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GLOSSARY OF BNA DATA

ABBREVIATIONS

BS	=	Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions
		and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Suffix added to sample number to indicate that results are from a diluted analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP, Z = Indicates Spiked Compound.



TECHNICAL FLAGS FOR MANUAL INTEGRATION

Manual quan modifications or integrations are performed routinely to improve the data quality for a variety of technical reasons. Documentation of these modifications should be clear and concise. The following "flags" are used to indicate the technical reasons for quan modifications:

- MP Missed Peak: manually added peak not found by automatic quan program.
- PA Peak Assignment: quan report was changed to reflect correct peak assignment.
- RI Routine Integration: routine integrations are performed for some analytes that are consistently integrated improperly by the automatic integration programs. Examples are the dichlorobenzene isomers on the VOA packed column and benzo(b)fluoranthene/benzo(k)fluoranthene which are poorly resolved on the BNA column.
- SP Split Peak: the automatic integration improperly split the peak; a manual integration was performed to get the correct area.
- CB Coelution/Background: peak was manually integrated to eliminate contribution from coeluting compounds, background signal, or other interference.
- Proper Integration: a peak with poor or inconsistent integration (e.g., excessive tail) was properly integrated manually.



Lionville Laboratory, Inc.

Semivolatiles by GC/MS, Special List Report Date: 12/10/02 11:58
Client: TNUHANFORD F03-005 H1984 Work Order: 11343606001 Page: 12

RFW Batch Numbe	r. 02117.201	Client: TNUHANFORD FO3-005 H1984 Work Order: 11343606001 Page: 1a														
KIN DOCCII NUMBO		CITCHC:	THORE	MIFORD FO	-005	H1304	WOI	k Order: 11	.34.3	90900I		Page: la				
	Cust ID:	B15YP	9	B15YP9)	B15YP9	•	SBLKIQ		SBLKIQ BS		SBLKIQ BS				
Sample	RFW#:	00:	Ĺ	001 MS		001 MSI)	02LE1401-M	181	02LE1401-M	œ1	02LE1401-1	MB1			
Information	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL				
	D.F.:	1.0	00	1.0	0	1.0	00	1.0	0	1.0	0	1.0	00			
	Units:	ug/l	Kg	ug/I	ζg	ug/F	ζg	ug/K	ζg	ug/F	ζg	ug/l	Kg			
<u></u>	Nitrobenzene-d5	57	8	73		68	8	71	g.	65	- 	58				
Surrogate	2-Fluorobiphenyl	59	왐	79	४	73	ક	78	ક	71	ક	. 61	8			
Recovery	p-Terphenyl-d14	68	윻	86	왐	86	ક્ષ	86	ક	86	왕	67	*			
	Phenol-d5	63	왐	79	8	70	ક	69	ह	63	ક	63	8			
	2-Fluorophenol	67	ક	77	8	67	*	75	ક	71	왐	68	*			
	4,6-Tribromophenol	49	왐	95	8	87	왐	63	*	67	૪	56	ક			
										_========	=f1	_=========	==fl			
Phenol	nyl)ether	350	Ü	76	8	67	ક	330	Ū	63	왐	63	용			
bis(2-Chloroeth	nyl)ether	350	Ü	350	U	350	U	330	U	330	U	330	U			
2-Chlorophenol		350	Ū	78	왐	69	ક	330	Ü	72	ક	69	ક			
1,3-Dichlorober	nzene	350	Ū	350	U	350	U	330	U	330	U	330	Ŭ			
I,4-Dichioropen	izene	350	Ū	76	¥	68	*	330	U	72	ક	67	8			
1,2-Dichlorober	nzene	350	Ū	350	U	350	U	330	Ū	330	U	330	U			
2-Methylphenol_		350	U	350	U	350	U	330	U	330	U	330	U			
2,2'-oxybis(1-0	Chloropropane)	350	Ŭ	350	U	350	Ü	330	Ū	330	U	330	U			
3- and/or 4-Met	hylphenol	350	Ü	350	U	350	ប	330	Ū	330	U	330	U			
N-Nitroso-Di-n-	-propylamine	350	Ū	84	8	74	ક	330	U	68	왐	66	*			
Hexachloroethan	ne	350	Ū	350	U	350	U	330	Ų	330	IJ	330	U.			
Nitrobenzene		350	Ū	350	U	350	U	330	U	330	U	330	Ü			
Isophorone		350	Ū	350	U	350	U	330	U	330	U	330	U			
2-Nitrophenol		350	Ū	350	U	350	U	330	Ū	330	U	330	U			
2,4-Dimethylphe	enol	350	U	350	U	350	IJ	330	U	330	U	330	U			
bis(2-Chloroeth	noxy) methane	350	Ū	350	U	350	U	330	U	330	U	330	U			
2,4-Dichlorophe	enol	350	Ū	350	IJ	350	Ü	330	U	330	Ū	330	U			
1,2,4-Trichloro	obenzene	350	U	78	*	75	*	330	Ū	69	ક્ષ	62	8			
Naphthalene		350	U	350	Ū	350	U	330	U	330	U	330	U			
4-Chloroaniline	•	350	U	350	U	350	U	330	U	330	U	330	U			
 Hexachlorobutad 	liene	350	U	350	U	350	U	330	Ü	330	U	330	U			
4-Chloro-3-meth	nylphenol	350	ប	95	8	87	8	330	Ū	68	ક	64	8			
2-Methylnaphtha	alene	350	Ŭ	350	U	350	U	330	U	330	U	330	Ū			
Hexachlorocyclo	pentadiene	350	บ	350	U	350	IJ	330	Ū	330	U	330	Ū			
2,4,6-Trichlore	ophenol		ប	350	U	350	U	330	Ū	330	U	330	Ū			
2,4,5-Trichloro	ophenol	880	U	880	U	880	U	830	U	830	U	830	Ū			

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0211L201	Client: T	NUHANFORD FO3	-005	H1984	Wor	k Order: 1134	Page: 1b	
Cust ID:	B15YP9	B15YP9)	B15YP9	_	SBLKIQ	SBLKIQ BS	SBLKIQ BSD
RFW#:	001	001 MS	001 MS			02LE1401-MB1	02LE1401-MB	02LE1401-MB1
2-Chloronaphthalene	350 t	J 350	U	350	U	330 U	330	J 330 U
2-Nitroaniline	- 880 0	J 880	Ū	880	U	830 U		J 830 U
Dimethylphthalate	350 t	350	U	350	U	330 U		J 330 U
Acenaphthylene	350 t	350	IJ	350	IJ	330 U		J 330 U
2,6-Dinitrotoluene	350 t	350	U	350	Ū	330 U		
3-Nitroaniline	880 0	J 880	Ū	880	U	830 U	=	J 830 U
Acenaphthene	350 t	J 86	ક્ષ	77	ક	330 U		67 %
2,4-Dinitrophenol	7 088	J 880	U	880	U	830 U		J 830 U
4-Nitrophenol	880 T	J 103	ક્ષ	97	と	830 U		55 %
Dibenzofuran	350 t	J 350	Ū	350	U	330 U		J 330 U
2,4-Dinitrotoluene	350 t	J 97 ∗	용	93 *	¥	330 U		75 %
Diethylphthalate	350 t	350	U	350	Ū	330 U	330	J 330 U
Diethylphthalate4-Chlorophenyl-phenylether	350 (350	IJ	350	U	330 U	330	J 330 U
Fluorene	350 t	350	U	350	U	330 U	330	ປ 330 ປ
4-Nitroaniline	088	J 880	U	880	Ū	830 U	830	J 830 Ū
4,6-Dinitro-2-methylphenol	J 088	J 880	U	880	U	830 U	830	
N-Nitrosodiphenylamine (1)	350 t	J 350	U	350	Ū	330 U	330	
4-Bromophenyl-phenylether		J 350	Ū	350	U	330 U	330	J 330 T
Hexachlorobenzene	350 t	350	U	350	U	330 U	330	
Pentachlorophenol	880 t	J 101	*	94 ′	용	830 U	41	42 %
Phenanthrene	350 t	J 350	Ú	350	U	330 U	330	
Anthracene	350 I	350	U	350	U	330 U	330	
AnthraceneCarbazole	350 t	J 350	Ū	350	U	330 U	330	J 330 U
Di-n-Butylphthalate	350 t	J 350	Ū	350	U.	330 U	330	J 330 U
Fluoranthene	350 t	350	U	350	U	330 U	330	
Pyrene	350 t	J 85	8	82	૪	330 U	86	68 %
Butylbenzylphthalate	350 t	J 350	U	350	U	330 U	330	J 330 U
3,3'-Dichlorobenzidine	350 t	350	U	350	U	330 U	330 1	
Benzo(a)anthracene	350 (J 350	U	350	U.	330 U	330	
Chrysene	350 t	J 350	U	350	Ü	330 U	330 1	
bis(2-Ethylhexyl)phthalate	350 t	J 350	Ŭ	350	U	330 U	330 1	
Di-n-Octyl phthalate	350 t	J 350	U	350	U	330 U	330 1	J 330 ປ
Benzo(b)fluoranthene	350 t	J 350	Ü	350	U	330 U	330 1	J 330 U
Benzo(k)fluoranthene	350 t	J 350	U	350	U	330 U		
Benzo(a) pyrene Indeno(1,2,3-cd) pyrene	350 t	J 350	U	350	U	330 U		
Indeno(1,2,3-cd)pyrene	350 t	J 350	Ù		U	330 U	· ·	
Dibenzo(a,h)anthracene	350 t	J 350	U		Ū	330 U		
Benzo(g,h,i)perylene	350 (350	Ü		U	330 U		
Tributylphosphate	350 t		U	350	U	330 U		
(1) - Cannot be separated from Dip	henylamine.	*= Outside	of E	PA CLP QC	lim		•	

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

	CLIENT	SAMPLE	NO.		
1				· · ·	
í	DIEVDO				

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

|B15YP9

Client: TNUHANFORD F03-005 H1984

Matrix: (soil/water) SOIL

Lab Sample ID: 0211L201-001

Sample wt/vol: $\underline{30.0}$ (g/mL) \underline{G}

Lab File ID: D120513

Level: (low/med) LOW

Date Received: <u>11/21/02</u>

% Moisture: $_{\underline{}}$ decanted: $(Y/N)_{\underline{}}$

Date Extracted: 11/22/02

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 12/05/02

Injection Volume: 2.0(uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: $\underline{7.0}$

CONCENTRATION UNITS:

Number TICs found: _5

(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	6.211	5000	JAB
2.	ALDOL CONDENSATE	6.819	40000	JAB
3.	ALDO CONDENSATE	7.410	300	JAB
4.	ALDOL CONDENSATE	8.123	4000	JAB
5.	ALDOL CONDENSATE	9.401	1000	JAB
	· · · · · · · · · · · · · · · · · · ·			l

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

	CLIENT	SAMPLE	NO.		
ļ		·		 	_
- [SBLKIQ				

Lab Sample ID: 02LE1401-MB1

Lab Name: Lionville Labs, Inc. Work Order: 11343606001

Client: TNUHANFORD FO3-005 H1984

Matrix: (soil/water) <u>SOIL</u>

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 0120510

Level: (low/med) \underline{LQW} Date Received: $\underline{11/22/02}$

% Moisture: ____ decanted: (Y/N)__ Date Extracted: 11/22/02

Concentrated Extract Volume: 1000(uL) Date Analyzed: 12/05/20

Injection Volume: 2.0(uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: __7.0 CONCENTRATION UNITS:

Number TICs found: $\underline{5}$ (ug/L or ug/Kg) $\underline{ug/Kg}$

			<u></u>	
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	0
=======================================			=========	
1.	ALDOL CONDENSATE	6.168	5000	JA
2.	ALDOL CONDENSATE	6.751	40000	JA
3.	ALDOL CONDENSATE	7.299	300	JA
4.	ALDOL CONDENSATE	8.020	3000	JA
5.	ALDO CONDENSATE	9.298	1000	JA
<u> </u>				

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Lionville Labor	atory (Jse Only	Custo	ody Ti	rans	fe	r F	Rec	ord/L	.ab \	No	rK	не	qu	les	L Pa	ge 🕹	Oī	:-			r d	V	. .	•
0211	La	21	FI	ELD PERS	OMMEL	L: CC	MP	LETE (ONLY SH	IADED /	AREA	s B	r		D			E		F	G	lio	ATH CA	ECRATOR	r fNt
		Hander	5 F	03-095			_7	Refrige	rator #		71	4	4		4			4		4	4			O	
1		pling Date						ATTempo		Liquid														\exists	
Project #	y	11343-60	06-00	- 4994-0	o `			жтуре	Container	Solid	la c	lac			100			lac		la.	les				
Project Conta	ct/Pho	ne #						Volume	1	Liquid	٥	0	0		\ <u>'</u>			U	_	0	0				موجعة
		Project Manag				S	<u>Q</u>	.		Solid	60	250	250	-	الما			125		<u>5∞</u>	60				- 50 ·
OC DESC	OC SPEC DOL STD TAT 30 Days)							Preser	vatives		-	OBC	ANIC	<u> </u>						_	-	Ĭ			
Date Rec'd	Date Rec'd 11 - 21 - 02 Date Due 12 - 21 - 02								ANALYSES REQUESTED			т—-	100	Feat	Alcohals Siyous			2.5€ 2.5€ 2.5€ 3.5€ 3.5€ 3.5€ 3.5€ 3.5€ 3.5€ 3.5€ 3	DRG S	رچ اچار	古		}		
MATRIX	1					Mate				1		······································		Į	——	Llonvi			ory Us	e Oni	У	1			<u> </u>
CODES: S - Soil SE - Sediment SO - Solid	Leb 10	c	ilent ID/Desc	cription		Choi (v)) Here	Matrix	Date Collected	Time Collected	Time # X X B B B B B B B B B B B B B B B B B		ofte		06.630			Mero Ecre		ZNORG ()	H d H				,
SL - Sludge W - Water O - Oil	001	B15YF	>9			X		S	11-18-02	0905		X	_		X			X		X	X				
A - Air DS - Drum		ļ						<u> </u>		 _	ļ				<u> </u>					<u> </u>					
Solids DL - Drum	 	 										 			 	 	{	. !							
L- EP/TCLP		<u> </u>						<u></u>	<u> </u>						 			<u> </u>							
Leachate WI - Wipe					 ∤-			<u></u>	<u> </u>		<u> </u>														
X - Other F - Fish	 -	<u> </u>									 -														
{		 		<u> </u>						<u> </u>	 -				-						-				
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Special Instruct	ione:	SAF ±	F01-	۵٥٤		D	ATE/	REVISION	iS:	010	Δı	<u> </u>	1	Δ. Σ	2. B	` B	n_			Lionvil	le Labor	ratory (Jse On	ly	
		JHF 4	•					:	1. As, B. 2. Cu. Fe.	Mg. Mr.	Mo.	N: 1	(No	TE	<u>V, Z,</u>	· Ho		1) Ha	nd Deli	werey d		1) P Paci	resent kage	on Out	N
0000-	Repo	.t Keo + Di	ro Com	mounds		1	NOR		icel.							resad		79		3814 nt on Ch	175 (Delli	Pac	Inbroker kage (Y resent o	() or	N
	•					_			5									3) 1	Receive	ed in G	ood		nbroker	y) or	N
						_			ß. <u></u> .										Sample medy F		ed .	Sam	ple 🕜	or h	
Relinquished by	Relinquished Received Date Time Relinquished by					ed		Received by		ito .	Tim		Samples La					1	O or	N		Recon n Samp		'n	
HED EX	2	Sprian	11-21-02	OHS	-			SITE		REWRITTEN Samples Labels and COC Record? Y or N NOTES:					5) Received Within Holding Times or N				Cook		_				

FLUOR Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST F03-005-015 Page 1												
Collector R. Nielson	Compa	ny Contact Trent	Telephon	e No.			Project Coordi TRENT, SJ		Price Code	8N		rearound	
Project Designation 200 Area Source Characterization 200-CS-1 OU - Waste M.	Sampli	ng Location					SAF No. F03-005		Air Quality		45	Days	
Ice Chest No. EQC - 99 - 030	Field L	ozbook No. NF - N- 32	57	COA 117514E	S10	Method of Shipm Federal Express							
Shipped To RECRA DAS (20/8	Offsite	Property No. Ac	300	43			Bill of Lading	Air Bill l	No. 5.C.	e OSF	الم		
POSSIBLE SAMPLE HAZARDS/REMARKS										1 Vill	1		
12,000 pCi/sm		Preservation	Cool 4C	Cool 4C		Cool		None		None	None		
Special Handling and/or Storage		Type of Container	G	≇G	G	***		G/P	G/P	G/P	G/P		
		No. of Container(s)	1	1	1	1			_	$\Gamma I I I$	1		
		Volume	60g	250g	60g	250	g 125g	500g	60g	1000	500g		
SAMPLE ANALYSIS			VOA - E260A (TCL)	See item (1) Special Instruction	Glycols, &	PCBq -	8082 See item (2) in Special Instructions	Sec item (1 Special Instruction	9045	See item (4) in Special Instructions.	Nickel-63; Technerium- 99; Trisium- 13())	8/02	
Sample No. Matrix * S	ample Date	Sample Time											
B15YP9 SOIL //.	-18-06	2 0905	X	X	X	×	<u>/</u>	3	/ <u>K</u>	[X]			
										ļ .			
								<u> </u>	Personnel not		3778 -		
			 						relinguish samples from _Ref# <u>f</u> on <u>(† </u>			<u> </u>	
				<u> </u>		<u> </u>		<u> </u>		1	<u> </u>	ļ	
CHAIN OF POSSESSION	Sign/Print				ECIAL INSTR)NS ic sampling instructi	was.				Matrix *	
Conquisted By/Reproved From Date/Time 1230 Re	Ker #	A 3728 11-18-1	12 / 23	ا م		-	d-On) (Tributyi pho		PH-Diesel Range	- WTPH-D		S=Soil SE=Soliment SO=Solid	
Reinquished By/Removed From Date/Time Re	ceived By/Ston	20 AI	te/Time	(2)	ICP Metals - 601	IOA (Sup	pertrace) (Arsenic, E ace Add-On) (Alum	larium, Ca	imium, Chromium	, Lead, Seleniur	n, Silver);	SI-Sindge W = Water	
2120 KIT IN 11120 02 1100	17300	III POL	o2 U.S te/Time	Licon	ı, Magnesium, Ma	anganese	, Molybdenum, Nicl	cel, Potass	um, Sodium, Thai	lium, Vanadium	, Zinc);	V=Vis O=OS	
Relinquished By/Removed From Date/Time Re	ceived By/Store	EX 11/20/	1	(4)	rcury - 7471 - (C' IC Anions - 300.	V); Chro 0 {Chlor	mium Hex - 7196 ide, Fluoride, Nitrat	e, Nitrite, I	hosphate, Sulfate); NO2/NO3 - 3	153.2;	DS-Drum Solids DL-Orum Liquids	
	ceived By/Store		te/Time	Am (4)	rnonia - 350.3; Su	ufides - 9	0030; Total Cyanide ; Gamma Spectrosco	- 9010				T=Tissue WI=Wipe	
Med & 11-21-02 0945		Durin 11-51		45 is	, Europium-155);	Gamma	Spec - Add-on (An	ericium-2	ii, Astimony-125	, Barium-133, C	езип-134,	L=Liquid V=Vegeterion	
Relinquished By/Removed From Date/Time Re	ceived By/Store	Da.	te/Time	lsot	opic Uranium; St	rontium-	dium-22, Tin-126}; 89,90 Total Sr; Ci	rbon-14; ì				X=Other	
Relinquished By/Removed From Date/Time Re	ceived By/Store	d In Du	te/Time	241	; Amencuan-241/		244 (Add-on) {Curi	WIF-242}					
LABORATORY Received By SECTION			Tiel							Da	ite/Time		
FINAL SAMPLE Disposal Method DISPOSITION		· · · · · · · · · · · · · · · · · · ·			Dispos	ed By				D	ate/fime		

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

CLIENT: THU Harriord

Purchase Order/Project:

DATE: 11.21.02

(SAF#) SOW# / Release #: F03-005

Laboratory SDG #:

ショトタの NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION □ No D N/A ☐ see Comment # Custody seals on coolers or shipping container intact, signed and dated? 2. Outside of coolers or shipping containers are □ N/A D see Comment # free from damage? 3. Airbill # recorded? see Comment # □ No □ N/A All expected paperwork received (coc and □ No □ N/A ☐ see Comment # other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid) 5. Sample containers are intact? D⁄Yes D No D N/A ☐ see Comment # Custody seals on sample containers intact, D No D N/A D see Comment # signed and dated? 7. All samples on coc received? D No D N/A D see Comment # 🔲 see Comment # D No D N/A All sample label information matches coc? Laboratory QC samples designated on coc? □ No DNA 🔲 see Comment # (QC stickers placed on bottles?) 10. Shipment meets LvLl Sample Acceptance ŻΎΥes □ No ☐ see Comment # D N/A Policy? (identify all bottles not within policy. See reverse side for policy) 11. Where applicable, bar code labels are ĎN/A ☐ Yes D No D see Comment # affixed to coc? DYes □ No D N/A ☐ see Comment # 12. coc signed and dated? M Yes 13. coc will be faxed or emailed to client? □ No DINA ☐ see Comment # 14. Project Manager/Client contacted ETN/A ☐ Yes □ No ☐ see Comment # concerning discrepancies? (name/date)

Cooler # / temp (°C) and Comments:

Elc. 99.030/ 1.2.

Laboratory Sample Custodian:

D'Amit's

Laboratory Project Manager:

Lionville Laboratory, Inc. PCB ANALYTICAL DATA PACKAGE FOR TNUHANFORD FO3-005 H1984

DATE RECEIVED: 11/21/02 LVL LOT # :0211L201

CLIENT ID	LVL	#	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
				,			
B15YP9	001		s	02LE1415	11/18/02	11/23/02	12/10/02
B15YP9	001	MS	S	02LE1415	11/18/02	11/23/02	12/10/02
B15YP9	001	MSD	S	02LE1415	11/18/02	11/23/02	12/10/02
LAB QC:							
PBLKGT	MB1		s	02LE1415	N/A	11/23/02	12/10/02
PBLKGT	MB1	BS	S	02LE1415	N/A	11/23/02	12/10/02



the waller



Analytical Report

Client: TNU-HANFORD F03-005

LVL#: 0211L201

SDG/SAF #: H1984/F03-005

W.O. #: 11343-606-001-9999-00

Date Received: 11-21-02

PCB

One (1) soil sample was collected on 11-18-02.

The sample and its associated QC samples were extracted on 11-23-02 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 12-10-02. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 2. All required holding times for extraction and analysis have been met.
- 3. The sample and its associated QC samples received a Sulfuric Acid and a Sulfur cleanup.
- 4. The method blank was below the reporting limits for all target compounds.
- 5. All surrogate recoveries were within acceptance criteria.
- 6. All blank spike recoveries were within acceptance criteria.
- 7. All matrix spike recoveries were within acceptance criteria.
- 8. All initial calibrations associated with this data set were within acceptance criteria.
- 9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

pef\r:\group\data\pest\tnu hanford\11L-201.pcb

Date

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.



GLOSSARY OF PESTICIDE/PCB DATA

DATA QUALIFIERS

- U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- **DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not Applicable.
- **DF** = Dilution Factor.
- NR = Not Required.
- SP = Indicates Spiked Compound.



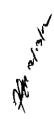
GLOSSARY OF PESTICIDE/PCB DATA

- This flag is used for an PESTICIDE/PCB target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- D = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C = This flag applies to a compound that has been confirmed by GC/MS.

PCBs by GC Report Date: 12/12/02 15:38

RFW Batch Number: 0211L201 Client: TNUHANFORD F03-005 H1984 Work Order: 11343606001 Page: 1

	Cust ID:	B15YP)	B15YP9)	B15YP9)	PBLKGT		PBLKGT BS		
Sample	RFW#:	~ 001	L	001 MS	;	001 MSD)	02LE1415-N	B 1	02LE1415-1	MB1	
Information	Matrix:	SOIL		SOIL		SOIL		SOIL		\mathtt{SOIL}		
	D.F.:	1.0	00	1.0	0	1.0	0	1.0	0	1.0	00	
	Units:	UG/I	KG .	UG/I	(G	UG/K	(G	UG/F	Œ	UG/I	KG	
Surrogate:	Tetrachloro-m-xylene	70	*	85	*	80		70	*	80	8	
	Decachlorobiphenyl	90	४	105	ક	105	왐	100	ક્ષ	100	옿	
		** * *===*	==fl==		=fl=:		=f1	=========	= f l	=========	==fl	======fl
Aroclor-1016	<u> </u>	35	Ū	87	*	98	ક્ષ	33	U	84	8	
Aroclor-1221	·	70	U	70	Ū	70	U	67	บ	67	U	
Aroclor-1232		35	U	35	U	35	U	33	U	33	U	
Aroclor-1242		35	U	35	U	35	U	33	U	33	U	
Aroclor-1248		35	υ	35	U	35	U	33	U	33	U	
Aroclor-1254	:	35	U	35	U	35	บ	33	U	33	U	
Aroclor-1260		35	Ū	106	*	106	¥	33	บ	100	&	



U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Lionville Labo	orator	y Use	Only (Custo	ody 1	rans	ste	rt	(ec	oru	au	II (117	• • •	- ر	· - -	-				7804		v	•	
021	1 L ¿	<u> 201</u>		FI	ELD PEI	RSONNE	L: C	OMP	LETE (ONLY SI	IADED A	AREA A	.s B	C		D		E	• •	F	G		PARTITION #43	uozaten	3160
Client	n	λ <i>Υ</i>	Jacobor	D F	03-005				Refrige	rator#			4	4		4				4	u		O.S	Φ	
Est. Final Pr									#(Tyme	Container	Liquid													E	0
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Project Con	tact/F	hone i	<i>-</i>						Volume	,	Liquid	0	0	C		ļ.,			<u> </u>	0	U		أسنا		
Lionville La	borst c	ory Pro	oject Maneg		gett.	. gah	~	<u>ري</u>			Solid	60	250	250	<u> </u>	100	 	<u> 13:</u>	5	500	60		لسبا		
QC 5/8	=	De	M	TAT	<u>യ</u>	 	===	===	Preser	vatives		 	OB	SANIC	<u></u>	W				<u> </u>	-				
Date Rec'd		-21	02_	Date Due	12-	21-02			REQUI			170×		100	Feb	Alcohols			NORG	13.5	哲				
MATRIX CODES:		}					Ma						·	~	Ţ.		Lionville					1.	<u></u>	<u></u>	ــــــــــــــــــــــــــــــــــــــ
S - Soil SE - Sediment SO - Soild	- f 1	ash D	CI	iont ID/Desi	cription	1		5 0 ∩ ∕)	Matrix	Date Collected	Time Collected	H+740	0615x	opea		okese		Dig	١	INORE O	I CH				
SL - Studge W - Water	-	. 7	2 15-15	-				MSD		ļ		1		_	 -						 		<u> </u>		<u> </u>
A - Air	px	24-1	315YF	<u> </u>	·	·	×	X	S	11.18-02	0905	X_	X	X		X.		X	-	X	X		 		<u> </u>
DS - Drum Solidis	-								 _		 			 	-		 -							 	ļ
DL - Drum Liquids	-										<u> </u>														
L EP/TCLP	-			<u>ه بي در حصوص مرحم بي</u> ا	··· <u>·</u>					 												· · · · · · · · · · · · · · · · · · ·	 -		
Wi - Wipe X - Other	-			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·											-	┝╼╼┼╍								-
F - Fish	-		<u> </u>		······································			╼-┤					 							+	-				
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Special Instru			SAF #				-		<u>. ()</u> :	1. As, Br 2. Cu, Fe. 3. ICLL.	Mg. Mm CLFL, I	Mo.	N; I	(NO2	TLA	V, Z, 04, 3	· Ha		i) Shipp Hand Di Airbili # 79,21 2) Amble 3) Recel	s were need	334H	1) Pac 2) (Pac 3) (on Out or on on O or on Seen	ter N Outer N mple
		·							-	3								14) Semp roperly	oles Preserve	sd .	Sar	Unbroke nple (*) C Recor	or N rdPres	sent
Relinquishe by	ď	~~	by With	Date 11-21-02	Time OPUS	} -			SITE	by	ORIGIEWR			•_ -	Samp	ies Lab Record	E Between els and ? Yor			ved With Times or	in	Upo Coo Ten	olar `	ole Rec	N

FLUOR	Hanfai	rd Inc	C	HAIN OF CUST	CODY/S	SAMPI	E ANAL	YSIS	RE	OUEST	•	F03-	-005-015	Page 1	of 1
Callartes ()	elson		Comp	env Contact	Telepho 373-5	ne No.			Pro	iect Coordin ENT, Si	eter i	rice Code	8N	Data Tur	
Project Designation		tion 200-CS-1 OU - W		lag Location 3					3 -	F No. -005	Ai	r Quality		45	Days
ice Chest No. EQC - 9	19-0	}ე	- Field	Lorbook No. 32	5/	COA 1175141	ES 10	·	F	thod of Ships ederal Expre	88		- AC	<i>2</i> 2	نه م
Shipped To PERVIOUS SERVERS SE	ECRA	, D45 /	Offsite	Property No. A	2300	543			Bill	of Lading/	Air Bill No.	51-	e 051	100	,
POSSIBLE SAMP	LE HAZA	RDS/REMARKS						1				1	1 2 14	1	
22,0	ros p	Ci/sm		Preservation	Cool 4C	Cool 40		Cool		None	None	None	None	None	
Special Handling	and/or S	itorage		Type of Container	G	aG	G 1	1	G	G/P	G/F I	G/P	G/P	G/P	
				No. of Container(s)							<u> </u>	<u> </u>			
				Volume	60g	250g	60g	250		125g	500g	60g	1000	500g	
		SAMPLE ANA	Lysis		VOA - \$260. (TCL)	A See item (1 Special Instruction	Glycols, &	PCBs -	- \$062	See item (2) in Special Instructions.	See item (3) in Special Enstructions.	pH (Soil) - 9045	See her (4) in Special fener cricies.	Techdelium- 99; Ticium - 13 C. Y	8102
Sample No	o	Matrix *	Sample Date	Sample Time	e aces			100	tin.	ar an ar	Escapit da S			determination	
815YP9		SOIL	11-18-09	2 0105	X	X	×	>	_		X	K	IX	V	
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CHAIN OF PO	OSSESSIC)N	Sign/Prin	it Names			ECIAL INSTI								Matrix *
Refinquished By/Remove 3728 Ref [] Relinquished By/Remove Relinquished By/Remove Relinquished By/Remove Relinquished By/Remove LABORATORY SECTION	ed From ed From ed From ed From ed From	Date/Time U-21-02 (1) Date/Time Date/Time	Received By/Sto Received By/Sto FFD Received By/Sto	red in 11/20	Date/Time 0.2 U 0.02 U 0.03 U 0.04 U 0.05 U 0.05	745 15 15 16 17 17 18 18	Please see SAF) Semi-VOA — 8) ICP Metals - 60 P Metals - 6010A on, Magnesium, Mercury - 7471 - (C)) IC Anions - 300 mmonia - 350.3; S) Gross Alphan-155 adium-226, Radius otopic Uranium; S 1; Americium-24	270A (A. OltoA (Superti Alanganes CV); Chric Jo (Chio Sulfides - Hoss Bets By Gamm 228, S Strontium	udd-Onj pertrace race A. te, Mol omium oride, F 9030; a; Gam a Spec Sodium i-89,90) {Tributyl pho ce) {Arsenic, B dd-On) {Alurni tybdenum, Nicl Hex - 7196 Fluoride, Nitrate Total Cyamide uma Spectrosco - Add-On {Am t-22, Tin-126}; - Total Sr; Ca	sphate; TPH arium, Cadmi izum, Beryllis cel, Potassium e, Nitrite, Pho - 9010 py (Cesium-1 ericium-241, Isotopie Plut urbon-14; Nep	ium, Chromium m, Bismuth, Bo a, Sodium, Thai sphate, Sulfate 137, Cobalt-60, Autimosy-125, mism; Isotopic	a, Lead, Seleminoros, Calcium, llium, Vanadium, llium, Vanadium, limm, Vanadium, limm, lim	Copper, m, Zinc); 353.2; t, Europium- Cesium-134, orium-232);	3-Sail SE-Sailmann SC-Said SS-Sailman W = Water C-Oli A-Air DS-Drum Sailds DL-Drum Lignids T-Tiome Wy-Wige L-Lignid V-Vagatation X-Other
FINAL SAMPLE	Disposal M	ethod					Diepo	seed By		 .			i	Date/Time	
DISPOSITION													·		

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

CLIENT: Thu Harriard

Purchase Order/Project:

DATE: 11-21-02

(SAF#) SOW#/Release #: F03-005

Laboratory SDG #:

1.	Custody seals on coolers or shipping container intact, signed and dated?	Yes	. □No	D N/A	see Comment #
2.	Outside of coolers or shipping containers are free from damage?	Yes	□ No	O N/A	☐ see Comment #
3.	Airbill # recorded?	"DoYes ,	□ No	□ N/A	☐ see Comment#
4.	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	D Yes	Ū No	□ N/A	□ see Comment#
5.	Sample containers are intact?	DOYes	□ No	□ N/A	See Comment #
6.	Custody seals on sample containers intact, signed and dated?	D Yes	□ No	□ N/A	☐ see Comment #
7.	All samples on coc received?	D Yes	□ No	, DN/A	· D see Comment #
8.	All sample label information matches coc?	Yes /	□ No	□ N/A·	see Comment #
9.	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	SPY es	□ No	□ N/A	[] see Comment #
10.	Shipment meets LvLl Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	≥ Yes	□ No	D N/A	☐ see Comment #
11	. Where applicable, bar code labels are affixed to coc?	□ Yes	□ No	DANA	D see Comment #
12	. coc signed and dated?	79-Yes	□ No	□ N/A	🗆 see Comment #
13	, coc will be faxed or emailed to client?	E Yes	□ No	DNA	D see Comment N
14	. Project Manager/Client contacted concerning discrepancies? (name/date)	□ Yes	· 🖸 No	BETVA	See Comment #

Cooler # / temp (°C) and Comments:

Elc. 99.030/ 1.2°

Laboratory Sample Custodian:

rtun W. a

A,-1/-

, N

Lionville Laboratory, Inc. GCSC ANALYTICAL DATA PACKAGE FOR TNU-HANFORD F03-005 H 1984

DATE RECEIVED: 11/21/02

LVL LOT # :0211L201

CLIENT ID	LVL	#	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
							
B15YP9	001		S	02LE1427	11/18/02	11/25/02	11/26/02
B15YP9	001	MS	S	02LE1427	11/18/02	11/25/02	11/26/02
B15YP9	001	MSD	S	02LE1427	11/18/02	11/25/02	11/26/02
LAB QC:							
BLK	MB1		s	02LE1427	N/A	11/25/02	11/25/02
BLK	MB1	BS	S	02LE1427	N/A	11/25/02	11/25/02
BLK	MB1	BSD	s	02LE1427	N/A	11/25/02	11/25/02



John waler



Analytical Report

Client: TNU HANFORD F03-005

LVL#: 0211L201

SDG/SAF#: H1984/F03-005

W.O.#: 11343-606-001-9999-00

Date Received: 11-21-02

GC SCAN

One (1) soil sample was collected on 11-18-02.

The sample and its associated QC samples were analyzed on 11-25,26-02 according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures based on method 8015B for n-propyl Alcohol and Ethanol.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 2. All required holding times for analysis have been met.
- 3. The method blank was below the reporting limits for all target compounds.
- 4. Surrogates are not currently employed in the methodology.
- 5. All blank spike recoveries were within acceptance criteria.
- 6. All matrix spike recoveries were within acceptance criteria.
- 7. All initial calibrations were within acceptance criteria.
- 8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria, with the exception of target compound Ethanol analyzed on 11-26-02 at 12:52. The data reflected an increase in instrument response, so the ability to identify this compound was not impaired. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as yerified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

Date

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.

Lionville Laboratory Sample Discrepancy Report (SDR) SDR #: 0266 561 Initiator: John Lach Batch: 0211 L 201, 202 Parameter: 06CSC 12/3/02 Samples: Au Matrix: 50.1 Date: Method: SW846/MCAWW/CLP/ Prep Batch: D2L E 1427. Client: 1. Reason for SDR _ Sampler Error on C-O-C a. COC Discrepancy ___ Tech Profile Error ___ Client Request ___ Wrong Test Code __ Other ____ b. General Discrepancy __ Container Broken __ Insufficient Sample __ Missing Sample/Extract __ Label ID's Illegible Wrong Sample Pulled _ Hold Time Exceeded Preservation Wrong Received Past Hold Not Amenable to Analysis Improper Bottle Type Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: c. Problem (Include all relevant specific results; attach data if necessary) CCU run paror to samples on 11/24/02 at 12:12 Am melevatry for Emmal at 20.5 % hant 15%. 2. Known or Probable Causes(s) 3. Discussion and Proposed Action Other Description: __ Re-log NAIGHT. __ Entire Batch Notits in sample 1, matrix QC Following Samples: Re-leach 100-106%. Ar etust. Re-extract Re-digest Revise EDD Change Test Code to Place On/Take Off Hold (circle) 4. Project Manager Instructions...signature/date: Concur with Proposed Action Disagree with Proposed Action; See Instruction Include in Case Narrative **Client Contacted:** Date/Person Add Cancel May 12/4/2 Other Explanation: 5. Final Action ... signature/date: _ Verified re-[log][leach][extract][digest][analysis] (circle) Included in Case Narrative Hard Copy COC Revised Electronic COC Revised **EDD Corrections Completed** When Final Action has been recorded, forward original to QA Specialist for distribution and filing. Route Distribution of Completed SDR Route Distribution of Completed SDR X Initiator X Lab General Manager: M. Taylor Metals: Beegle __ Inorganic: Perrone __GC/LC: Kiger X Project Mgr. Stone/Johnson/Haslett

X Technical Mgr: Wesson/Daniels

__ Data Management: Feldman

Sample Prep: Beegle/Kiger

X QA (file): Alberts

MS: Rychlak/Layman

__ Log-in: Melnic

__ Admin: Soos

_ Other: _ ___



GLOSSARY OF GC SCAN DATA

DATA QUALIFIERS

- U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- **BSD** = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- **DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not Applicable.
- **DF** = Dilution Factor.
- NR = Not Required.
- SP = Indicates Spiked Compound.

GC SCAN

Report Date: 12/03/02 15:10

	Cust ID:	B15YP9	B15Y	P9	B15YP	9	BLK		BLK BS		BLK BSI	,
Sample Information	RFW#: Matrix:	001 SOIL	001 I	_	001 MS		02LE1427-M SOIL	B1	02LE1427-ME SOIL	B1	02LE1427-N	B 1
nformation	D.F.: Units:	1.00 mg/kg	1	.00 /kg	1. mg/		1.0 mg/k		1.00 mg/kg		1.0 mg/k	
				===fl=	=======	==f1		=f1		=fl:		==f1
n-Propyl Alcohol		27 U	97	ક	98	ક		Ū	100	ક	100	%
Ethanol		27 U	100	%	101	*	25	U	102	%	103	8

After akelow

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Lionville Labor	atory l	Jse Only	Custo	dy T	rans	sfe	er F	Rec	ord/L	.ab \	N O	rk	He	qu	ヒン	L Pa	ge <u>.</u>	U	<u></u>			33	V	J	j
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		Harrior	D F	23-005				Refrige	rator#		A	B 4	4		D +			7	, — <u>-</u>	<u> </u>	4				
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		11343-60			00			#1ура	Container	Solid	loc	las			00			lac		a	a c				
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S - Soil SE - Sediment SO - Solid SL - Sludge	i.ab ID	C	lient ID/Desc	ription		Cho (4	MSD	Matrix	Date Collected	Time Collected	9624#	0625×	opt is		Obese			Mers Lere		ZNORE ()	I P H				
W - Water 0 - Oil	001	BI5YF	>0			X	×	S	11-18-02	905		×			X		_	×	-	×	×		_	 	 -
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Solids DL - Drum		 		<u></u>							<u> </u>				·]								
Liquids L EP/TCLP		<u> </u>	·					<u> </u>																	
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Special Instruct	ons:	5AF ±	F03-6	200		- 1	DATE	REVISION	IS:	CLC	. Ø1	ς,	Λ.	A: B	. 13	· R (າ_			Lionvill	e Lebo	ratory	Use O	niy	
- 09 00	Repor	+ KRO + DA				-		<u>60</u> :	As, Bo Cu, Fo, TCCL, J IMINZ	Mg.Mn CCFL, I	Ms.	N; k	NO2	,TL,	V, Z, 04, :	, Hg		1) Haa Aird 7(2) 3) Cod	nd Deli bili # Ambien Receive ndition Sample	vered _ 3814 t on Chi ed in Gr	334+ 860 N	1) Pa 2) Pa 3) 1 4) Sa	Unbroke	en Out en on O y or on Saa Y or an on	iter N Duter N mple N
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FLUOR Han	ford Inc.	CI	IAIN OF CUST	ODY/S	AMPL	E ANAL	YSIS	REQUEST		F03	-005-015	Page 1	of 1
Collector R. Nielso	n	Compa	ny Contact Trent	Telephon	e No.			Project Coordii TRENT, SJ	nator	Price Code	8N	Data Tu	raaround
Project Designation	ization 200-CS-1 OU - Wast	Sampli	ng Location					SAF No. F03-005		Air Quality		45	Days
In Chart No.			ozbook No.	57	COA 117514E	510		Method of Ship Federal Expre		· · · · · · · · · · · · · · · · · · ·			
Shipped To PECP	A DAS /20	Offsite	Property No. Ac	300	43			Bill of Lading/	Air Biii N	10. 5e-	e 051	100	
POSSIBLE SAMPLE HAS	ZARDS/REMARKS		Preservation	Cool 4C	Cool 4C	Cool 4C	Cool	4C None	None	None	None	None	
Special Handling and/o	•		Type of Container	G	aG	G	₽G	G/P	G/P	G/P	G/P	G/P	
			No. of Container(s)	1	1	1	1	1	1	1	\'\	1	l
 - 			Volume	60g	250g	60g	250	g 125g	500g	60g	1009	500g	
	SAMPLE ANALY	sis		VOA - 8260A (TCL)	See item (1) Special Instructions	Alcohols, Glycols, & Ketones - 8015M (Add- on) (1- Propunol, Ethanol)	PCBs -	See item (2) in Special Instructions.	See item (3 Special Instruction	9045	See stern (4) in Special Instructions.	Nickel-63; Technetium- 99; Trainm -	8102
Sample No.	Matrix *	Sample Date	Sample Time	***									
B15YP9	SOIL	11-18-02	2 0105	X	X_	<u> </u>	×	<u> </u>	<u> </u>	/ K	1X		
										Personnel not			
										relinguish san Ref# <u>{ ^ </u>			
CHAIN OF POSSESS	TON.	Sign/Print	Names	<u> </u>	Jene	CIAL INSTR	L	NE	<u> </u>	L	<u> </u>		Matrix *
Relinquistled By/Removed From	Date/Time 1230 NICSON 11-18-02 Date/Time 11/20/02 (1000	Received By/Stor Received By/Stor Received By/Stor TTD Received By/Stor	ed in Da	oz lio	(1) (2) ICP Iron Men (3) Ann (4) 154 Rad Isot	Please see SAF fi Semi-VOA 82 ICP Metals - 601 Metals - 6010A Magnesium, Mi cury - 7471 - (C' IC Anions - 300. nonis - 350.3; Si Gross Alpha; Gr Europium-155); ium-226, Radium opic Uranium; St	or specification of the control of t	d-On) {Tributyl pho ertrace) {Arsenic, B ice Add-On) {Alumi , Molybdenum, Nich mium Hex - 7196 ide, Fluoride, Nitrate 030; Total Cyanide Gamms Spectrosco Spec - Add-on {An dium-22, Tin-126]; 89,90 — Total Sr; Ca 244 (Add-on) {Curi	sphate); Ti arium, Cad inum, Bery cel, Potassi e, Nitrite, P - 9010 py {Cesium ericium-24 Isotopic Pl urbon-14; N	Imium, Chromium Ilium, Bismuth, Be ann, Sodium, Thal Phosphate, Sulfate m-137, Cobak-60, ktonium; Isotopic ktonium; Isotopic	, Lead, Selenium oron, Calcium, G lium, Vanadium I; NO2/NO3 - 3 Europium-152, Barium-133, C Thorium {Thor	Copper, 1, Zinc}; 153.2; Europium- cesium-134, ium-232};	S-Solid S-Solid SI-Stodge W = Water O-Oil A=Air DS-Dram Solide T-Tipme WI-Wipe L-Liquid X=Other
LABORATORY Received	Ву			Tit	le	··					D	ate/Time	
	Method					Dispos	sed By				E	ate/Time	

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

CLIENT: Thu Hartord

Purchase Order/Project:

DATE: 11-21-02

(SAF#) SOW# / Release #: F03-005

Laboratory SDG #:

re:	ALL ENTRIES MARKED "NO" MUST BE E	XPLAINED II	N THE COMM	ENT SECTION	
1.	Custody seals on coolers or shipping container intact, signed and dated?	EXY es	□ No	D N/A	☐ see Commen
2.	Outside of coolers or shipping containers are free from damage?	Yes	□No	□ N/A	🗆 see Commen
3.	Airbill # recorded?	Doyes	D No	D N/A	: see Commen
4.	All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	Q Yes	D No	. DN/A	
5.	Sample containers are intact?	USVVes	□ No	□ N/A	D see Commer
6.	Custody seals on sample containers intact, signed and dated?	D Yes	□ No	□ N/A	C) see Comme
7.	All samples on coc received?	(D) Yes	□ No	□ N/A	☐ see Comme
8.	All sample label information matches coc?	Yes	□ Ņo	□ N/A·	see Comme
9.	Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	Yes	□ No	DNA	□ see Comme
10.	Shipment meets LvLI Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	∑d Yes	□ No	□ N/A	☐ see Comme
11.	Where applicable, bar code labels are affixed to coc?	☐ Yes	□ No	SINIA	☐ see Comme
12.	coc signed and dated?	Torres	□ No	D N/A	🗅 see Comme
13.	coc will be faxed or emailed to client?	W Yes	□ No	D N/A	□ see Commo
14.	Project Manager/Client contacted concerning discrepancies? (name/date)	□ Yes	· DNo	B NA	🖸 see Comm

Cooler # / temp (°C) and Comments:

Elc. 99.030/ 1.200

Laboratory Sample Custodian:

Tung Co

Laboratory Project Manager:

DRO ANALYTICAL DATA PACKAGE FOR TNU-HANFORD F03-005 1108 4

DATE RECEIVED: 11/21/02

LVL LOT # :0211L201

CLIENT ID	LVL #	мтх	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B15YP9	001	s	02LE1400	11/18/02	11/22/02	11/27/02
B15YP9	001 MS	S	02LE1400	11/18/02	11/22/02	11/27/02
B15YP9	001 MSD	S	02LE1400	11/18/02	11/22/02	11/27/02
LAB QC:						
BLK	MB1	s	02LE1400	N/A	11/22/02	11/28/02
BLK	MB1 BS	S	02LE1400	N/A	11/22/02	11/28/02

ABU 12/14/2





Analytical Report

Client: TNU-HANFORD F03-005

LVL #: 0211L201

SDG/SAF #: H1984/F03-005

W.O. #: 11343-606-001-9999-00

Date Received: 11-21-02

DIESEL RANGE ORGANICS

One (1) soil sample was collected on 11-18-02.

The sample and its associated QC samples were extracted on 11-22-02 and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 11-27,28-02. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8015B. The analysis met the intent of method WTPH-D.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 2. All required holding times for extraction and analysis have been met.
- 3. The method blank was below the reporting limits for all target compounds.
- 4. All surrogate recoveries were within acceptance criteria.
- 5. The blank spike recovery was within acceptance criteria.
- 6. All matrix spike recoveries were within acceptance criteria.
- 7. All initial calibrations associated with this data set were within acceptance criteria.
- All continuing calibration standards analyzed prior to sample extracts were within acceptance 8. criteria.
- 9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

L'aboratory Manager

Lionville Laboratory Incorporated

pef\r:\group\data\dro\tnu hanford\11L-201.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of



GLOSSARY OF DIESEL RANGE ORGANICS DATA

DATA QUALIFIERS

- U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP = Indicates Spiked Compound.

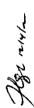


GLOSSARY OF DIESEL RANGE ORGANICS DATA

- **D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C = This flag applies to a compound that has been confirmed by GC/MS.

DIESEL RANGE ORGANICS BY GC

RFW Batch Number: 0211L201 Client: TNU-HANFORD F03-005 Work Order: 11343606001 Page: 1 B15YP9 B15YP9 B15YP9 BLK BS Cust ID: BLK Sample RFW#: 001 001 MS 001 MSD 02LE1400-MB1 02LE1400-MB1 Information SOIL SOIL SOIL SOIL Matrix: SOIL D.F.: 1.00 1.00 1.00 1.00 1.00 mg/Kg mg/Kg mg/Kg Units: mg/Kg mg/Kg p-Terphenyl 84 ş 81 왐 84 કૃ 106 율 Diesel Range Organics____ 12.7 U 63 70 왐 12.0 U 용 71 Kerosene 12.7 U 12.7 U 12.7 U 12.0 U 12.0 U



Report Date: 12/03/02 13:07

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

10

PRILIPPERSONNEL: COMPLETE ONLY SHADED AREAS A B C D E G Complete TITLL Hackers F03-005 Refigerator # U 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Lionville Labora	atory (Jse Only C	usto	dy Tr	ans	fe	r F	lecc	ord/L	ad 1	VO	IN	UC	qu	G 31	rayo.			•		6.8	VI	1	
Client TOLL Haction Fo3-po5 Rentigerator # 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4					_													_					V I	1 15 A 14 BY	
Client TOLL HOCKER F93-05 Est. Final Proj. Sampling Date (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (134) - (40 - 001 - 999 - 00 (135) - 500 (60	0211	<u>_2(</u>	<u> </u>	•	,							A	_	C		D		<u> </u>		F,	<u>G</u>				
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Project Content/Phone # Lidentifies Laboratory Project Manager On Datt L Quidad Of Date On On Date On On Date On Date On	Project #	,,	(1343-60	6-001	- 9999-00	0					Solid	اور		lac		وها		lag	ļ		las			, d	
Solid Soli	Project Conta	ct/Pho	ne #						Volume		Liquid	٥	0	0				<u> </u>		0	<u> </u>				
Date Rec'd 11-21-02 Date Due 12-21-01 MATTRIX CODES: Codes II Date Due 12-21-01 Mattrix Date Due 12-21-01 Date Due 12-21-0	Lionville Labe	xratory	Project Manage	- O27	o tte	Johr	<u> </u>	2			Solid	60	250	250	,,,,,,	عما		125	<u>' </u>	500	60		<u> </u>		
Date Ried 1-2-1-0 MACTRIX CODES: Lab S. Soldment S. S	OC SPEC		Del 210	TATS	DOM/	<u>0</u>		==	Preserv	etives	<u> </u>	_	OPC		<u> </u>		-		000	+	-				
MATTROX COLORS S - Sold Color Lab	1								ANALY	SES	_	74			P	80				1 2/2	エ		1		
Collected (c) Matrix Collected Colle	Date Rec'd	11:6	31.02	Date Due	12 -2	1-01			RECUE	STED		25	NA.	15.5	Į	100		್ರಿ≅್ನ	\$ 5	الخ ال	1 0		1		
S. Sold Lab Client ID/Description Chosen (v) Matrix Collected Collected						<u> </u>									Ţ		Lionville i	aborat				ļ			
Without Special instructions: Special instructions: SAF xt F03-005 DATEMEVISIONS: ALTO 1. As, Ba, Cd, Cr, Pb, Se, Ag, Al, Bb, B. Ca, Samples very 15 Ninged or Hard Daliver Fresh 17 Ninger Resistant Seal vers. 1. As, Ba, Cd, Cr, Pb, Se, Ag, Al, Bb, B, Ca, Samples very 15 Ninged or Hard Daliver Fresh 19 Ninged or Hard Daliver Fresh 19 Ninged or Hard Daliver Fresh 19 Ninged or Ningel Received By 15 Ninged or Ningel Received By 15 Ningel Received By 15 Ningel Received Date Time By 15 Ningel Received Date Time By 15 Ningel Received Within Hotsing Times Notes (CORPOSITE) DO RO - Ruper + KRO + DRO Composition Cooking Times Notes (CORPOSITE) Relinquished Break As (CORPOSITE) Relinquished Break As (CORPOSITE) Relinquished Break As (CORPOSITE) DATEMEVISIONS: ALTO 1. As, Ba, Cd, Cr, Pb, Se, Ag, Al, Bb, B, Cd, Samples werey 15 Ninged or Received Date Time By 15 Ningel Belower Sample (Do or No. Sample Cooking Times Date Time By 15 Ningel Received Within Hotsing Times No. Cooking Times No. Or No.			Cii	ent ID/Desc	ription	ļ	Cho	\$0N	Matrix			=	× s	2]	ವ		9.	,	9	{		}		
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Special Instructions: SAF ± F03-095 DATE/REVISIONS: ACL C, Pb, Se, Ag, Al, Bt, S. B, Ca, Sequence of the control of the con	SL - Sludge	 	0.50	<u> </u>								0						<u>'</u>	+						
Special instructions: Special instructions: Special instructions: Special instructions: Special instructions: Special instructions: SAF # F03-005 DATERIEVISIONS: ALTO: 1. AS, B., Cd. Cr. Pb, Se, Ag, Al. Be, B.'. B, Ca, 2. Cu. Fg, Mg, Mn, Mo, Ni, K, Na, TL, V, Zn, Hg 2. Cu. Fg, Mg, Mn, Mo, Ni, K, Na, TL, V, Zn, Hg 2. Cu. Fg, Mg, Mn, Mo, Ni, K, Na, TL, V, Zn, Hg 2. Cu. Fg, Mg, Mn, Mo, Ni, K, Na, TL, V, Zn, Hg 2. Cu. Fg, Mg, Mn, Mo, Ni, K, Na, TL, V, Zn, Hg 2. Cu. Fg, Mg, Mn, Mo, Ni, K, Na, TL, V, Zn, Hg 2. Cu. Fg, Mg, Mn, Mo, Ni, K, Na, TL, V, Zn, Hg 2. Unbridge of Or N 3. Incl. Lightly Laboratory Use Only Samples werey 1) Shopped or Package (V) or N Alrilli #	0 - ON	∞i	PIZAL	<u> </u>	<u> </u>		2	11.18.02	0905	A	X	X	 -	X		X	 	 	X						
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Special Instructions: 5AF xt F03-005 DATEREVISIONS: ALTO 1. As. Ba. Cd. Cr. Pb. Se. Ag. Al. Bt. B. B. B. Cd. Co. Fg. Mg. Mn. Mo. N; K. Nn. Tt. V. Zn. Hg INOR 6. O 3. LCCL_ ZEFL , XC AD3. LC AD4. LC SQ4. TABLE ZEFL , XC AD3. LC AD4. LC SQ4. TABLE ZEFL , XC AD3. LC AD4. LC SQ4. TABLE ZEFL , XC AD5. LC AD6. A LAST Discrepancies Between Samples or N A) Samples Samples or N Hard Delivered — Package (V) or N A) Unbroken on Outer Package (V) or N A) Samples Sample Or N COC Record Present Upon Sample Not Or N COC Record Present Upon Sample Not COC Record Present COC Record Present COC Rec	WI - Wipe	 	ļ							<u></u>				 -				- 	 	-					
Special Instructions: 5AF ± F03-005 NETO 1. As Bo. Cd. Cr. Pb. Se, Ag, Al Be, B. B. Ca. 2 Cu. Fg, Mg, Mn, Mo, N; K, No. TL, V, Zn, Hg 1) Shipped or Hand Delivered 1) Shipped or Hand Delivered 1) Shipped or No.		<u> </u>								·			-		 -				╂	┼					
Special Instructions: SAF ± F03-005 NETO 1. As. Be. Cd. Cr. Pl. Se. Ag. Al. Be. B. B. Ca.		<u> </u>			······································		[_			 	 -				+	 	 -	┝╼┪				
Special Instructions: SAF ± F03-005 NETO 1. As. Be. Cd. Cr. Pl. Se. Ag. Al. Be. B. B. Ca.			<u> </u>	,,	<u></u>	}				 		<u> </u>							 	┼					
Special Instructions: SAF ± F03-005 NETO 1. As. Be. Cd. Cr. Pl. Se. Ag. Al. Be. B. B. Ca.												-	├					+	 	+					
Special Instructions: 5AF # F03-005 INTO 1. As. Be. Cd. Cr. Pb. Se. Ag. Al. Be. B. B. Ca. 2 Cu. Fg. Mg. Mn. Mo. Ni; K. Ne. Tl. V. Zn. Hg INOR 6. O 3 ICCL. ICFL. IC NO3. ICNO2. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. IC NO3. ICNO2. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICNO2. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICNO2. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICNO2. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICNO2. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICNO2. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICNO2. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICNO3. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICROY. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICROY. ICROY. INOR 6. O 3 ICCL. ICFO. ICROY. INOR 6. O 3 ICCL. ICFL. ICROY. ICROY. INOR 6. O 3 ICCL. ICFO. ICROY. INOR 6. O 3 ICCL. ICFL. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICROY. ICROY. INOR 6. O 3 ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICROY. ICROY. INOR 6. O 3 ICCL. ICFL. ICROY. ICROY. INOR 6. O 3 ICROY. ICROY. INOR 6. O 7 ICROY. INOR 6. O		Ĺ	1					DATE	REVISION	ls:		<u> </u>			<u> </u>	<u> </u>	<u> </u>	┸┲	<u> </u>	Lionvil	le i sho	ratory	Use On		==
2 Cu, Fg, Mg, Mn, Mo, N; K, Nn, TL, V, Zn, Hg INOR 6. O 3 LCCL, ZCFL, IC NO3, ICNO2, ICRO4, ICSO4, IR3 N2, INH3 N, ISFD, ICNO2 IR3 Namples and Condition (Condition (Con	Special Instruct	eñoi:	SAF ±	F03-	200			Ŋ٤	τ⊙_	As. B	" G9" 6	r. P	, Se,	<u>. 4</u>	AJ. B	B. B.	<u>. B, Ca</u>	_ _	amolas			<u>·</u>			was:
TNOR 6. 0 3 ICCL, ZCFL, ICNO3, ICNO2, ICRO4, ICSO4 Airbill # 2) Unbroken on Outer Package(V) or N 1/03 N2, INH3 N, ISFD, ICNTO 2) Ambient or Chilled 3) Present on Sample 2) Unbroken on Outer Package(V) or N 2) Ambient or Chilled 3) Present on Sample 3) Received in Good Condition (Y) or N 4) Unbroken on Outer Package(V) or N 4) Samples Relinquished Received Date Time by Discrepancies Between Samples Labels and COC Record? Y or N 5) Received Within (Y) or N COC Record? Y or N 5) Received Within (Y) or N COC Record? Y or N NOTES: COURS OF N COURS OF N COOR Received Within (Y) or N Tamp (A) Cooler Times Cooler Time (Y) or N Tamp (A) Cooler Times Cooler Time (Y) or N Tamp (A) Cooler Times							·			Cu. Fe.	Ma. Ma	Mo	N:	K, N.	TL	V, ≥ ,	· He	(1)	Shippe	ed 🔽		1) [Present	op Ou	ier i
ODRO - Ruport KRO + DRO Compounds 4. INSN INH 3 N I SFD I CNTO 2) Ambient or Chilled 3) Present on Sample or N 3) Received in Good Condition (f) or N 4) Samples Sample (f) or N COC Record Present Upon Sample Rec't Cooler Samples Labels and COC Record? Y or N COC Record? Y or N NOTES: Cooler OR NOTES: Cooler Or N Coc Record? Y or N NOTES: Temp 1. 2 °C	1							THOS			-							A	irbill # _			2) (
3) Received in Gooti Condition (?) or N 4) Unbroken on 4) Samples Sample (*) or N 4) Samples Labels and Samples Labels and COC Record? Y or N 5) Received Within (*) or N COC Record? Y or N Holding Times Cooler Temp (*) 22 °C	0700	٥.	+ Ken + DA	o Con	sour de		-	A11													_	ł Pai	ckage()	() or	N [
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LINE C. IN NOTES: YEAR DESCRIPTION OF THE CONTROL O	ļ			<u> </u>				RADI	SITE	,	ORIG	MA		7	coc	Record					ılrı	Cod	oler .	_	1
/ \	MODER	\	Different T	11-21-02	OH5					F	EWR	 T	EN		NOT	ES:	_		-	(A) of	N	Ter	np. 🊣	مل	°C

FLUOR	Hanford Inc.	CI	HAIN OF CUST	ODY/S	AMPLE	CANALY	YSIS	REQUEST		F0:	3-005-015	Page 1	of 1
Collector R. Nil	· · · · · · · · · · · · · · · · · · ·	Сомря	any Contact e Trent	Telephon 373-58	ne No.			Project Coordin TRENT, SJ		Price Code	8N		rnaround
Project Designation 200 Area Source Cha	aracterization 200-CS-1 OU - Was		ing Location					SAF No. F03-005		Air Quality	у 🔘 .	45	Days
Ice Chest No.			ogbook No. N.F N 32	5/	COA 117514ES	10		Method of Ships Federal Expres					
Shipped To RE	CRA DAS (20) (D) Offsite	Property No. Ac	300	43			Bill of Lading/	Air Bili !	No. 52	2 OSt	ما ا	
POSSIBLE SAMPL	E HAZARDS/REMARKS		Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4	4C None	· None	None	None	None	
	• /	ļ	Type of Container	G	aG	G	aG	i G/P	G/P	G/P	G/P	G/P	
Special Handling a	ind/or Storage		No. of Container(s)	i	I	1	1		1	1	1 1,1	1	
		!	Volume	60g	250g	60g	250	g 125g	500g	60g	100	500g	
	SAMPLE ANALY	YSIS		VOA - 826QA (TCL)	See item (1) in Special Instructions.	Alcohols, Glycols, & Ketones - 8015M (Add- on) {1- Propusol, Ethanol)	PCBg - 1	8082 See item (2) in Special Instructions.	See item (1 Special Instruction	9045	See item (4) in Special Instructions	Nickel-63; Technicism- 99; Trium-	18102
Sample No.	Matrix *	Sample Date	Sample Time							1,000			
B15YP9	SOIL	11-18-06	2 0905	X	X	X	X	<u></u>	ر	L K	1/X		
				 		┨——┨		- 	 		<u>'</u>	<u> </u>	
}				}	 	 			 	relinquish sa	t available to imples from th	he 3728 - T	} -
						 				_Ref# <u>{ </u>	on <u>(1</u> /20	<u> /۵⊁</u>	
CHAIN OF POS Refinquistled By/Removed 3728 & IA Relinquistled By/Removed Relinquistled By/Removed Relinquistled By/Removed Relinquistled By/Removed Retinquistled By/Removed	Prom Date/Time 1/30	Received By/Ston Received By/Ston Received By/Ston	ed in Da 11/20 120 ed in Da 11/20 ed in Da 11/20 ed in Da 11/20 ed in Da 11/20 ed in Da	ate/Time	(1) S (2) Io ICP h Iron, I Merce (3) Io Amm (4) G 154, I Radiu Isotop	Semi-VOA 82: CP Metals - 601 Magnesium, Ma sury - 7471 - (CV C Anions - 300.6 sonia - 350.3; Su Gross Alpha; Gre Europium-155); um-226, Radium pic Uranium; Str	or specific 70A (Add 10A (Supertra anganese, V); Chron 0 (Chlori alfides - 9 oss Beta; ; Ganuma n-228, Sourontium-8	DNS ic sampling instruction id-On) {Tributyl phosertrace} {Arsenic, Bace Add-On) (Alumia, Molybdensum, Nick mium Hex - 7196 ide, Fluoride, Nitrate 1030; Total Cyanide; Gazzaza Spectroscoj Spec - Add-On {Am dium-22, Tin-126}; 189,90 — Total Sr; Ca 244 (Add-On) {Curiu	sphate); T larium, Cac itum, Bery tel, Potassi e, Nitrite, I ~ 9010 py {Cesium pericium-2- lsotopic P urbon-14; N	dmium, Chromiu Alium, Bismuth, I- ium, Sodium, The Phosphate, Sulfater 137, Cobak-60 41, Antimosy-12 Jutonium; Isotopi	m, Lead, Selenium, Goron, Calcium, Gallium, Vanadium, e); NO2/NO3 - 3 D. Europium 152, S. Barium-133, Cie Thorium (Thor	Copper, a, Zinc}; 353.2; , Europium- Cesium-134, rium-232};	Matrix * S-Soil SE-Stodge SO-Solid SI-Stodge W = Water C-Oil A-Air DS-Drum Solids DL-Drum Liquids T-Time WI-Wipe L-Liquid V-Vegetation X-Other
LABORATORY ROSECTION	eccived By			Titl	æ						Di	ate/Time	
	Pisposal Method					Dispos	red By				D	Pate/Time	

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

Purchase Order/Project:

11.21.02 DATE:

(SAF#) SOW# / Release #: F03-005

Laboratory SDG #:

NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION Custody seals on coolers or shipping Q//es □ No D N/A ☐ see Comment # container intact, signed and dated? Outside of coolers or shipping containers are ☐ No □ N/A ☐ see Comment # free from damage? 3. Airbill # recorded? □ No D N/A ☐ sec Comment # All expected paperwork received (coc and □ No □ N/A other client specific: historical data, see Comment # alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid) Sample containers are intact? DY es □ No □ N/A ☐ sec Comment # Custody seals on sample containers intact, □ N/A D see Comment # signed and dated? All samples on coc received? D Yes □ No D N/A D see Comment # 7 Yes □ No see Comment # D N/A All sample label information matches coc? 9. Laboratory QC samples designated on coc? □ No D N/A See Comment # (QC stickers placed on bottles?) 10. Shipment meets LvLI Sample Acceptance ŻY Yes D No D N/A ☐ sec Comment # Policy? (identify all bottles not within policy. See reverse side for policy) 11. Where applicable, bar code labels are ☐ Yes □ No Y/NA ☐ see Comment # affixed to coc? ⅋⅋ 12. coc signed and dated? DNA 🗆 see Comment # 13. coc will be faxed or emailed to client? E Yes D No D N/A D see Comment # 14. Project Manager/Client contacted EN N/A ☐ Yes □ No See Comment # concerning discrepancies? (name/date)

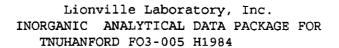
Cooler # / temp (°C) and Comments:

Elc. 99.030/1.2"

Laboratory Sample Custodian:

Ptur

Laboratory Project Manager:



DATE RECEIVED: 11/21/02 LVL LOT # :0211L20 222920

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
					 	
B15YP9			,			
SILVER, TOTAL	001	s	02L0691	11/18/02	11/25/02	11/27/02
SILVER, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
SILVER, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
ALUMINUM, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
ALUMINUM, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
ALUMINUM, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
ARSENIC, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
ARSENIC, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
ARSENIC, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
BORON, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
BORON, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
BORON, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
BARIUM, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
BARIUM, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
BARIUM, TOTAL	001 MS	s	02L0691	11/18/02	11/25/02	11/27/02
BERYLLIUM, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
BERYLLIUM, TOTAL	001 REP	s	02L0691	11/18/02	11/25/02	11/27/02
BERYLLIUM, TOTAL	001 MS	s	02L0691	11/18/02	11/25/02	11/27/02
BISMUTH, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
BISMUTH, TOTAL REP	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
BISMUTH, TOTAL SPIKE	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
CALCIUM, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
CALCIUM, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
CALCIUM, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
CADMIUM, TOTAL	001	s	02L0691	11/18/02	11/25/02	11/27/02
CADMIUM, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
CADMIUM, TOTAL	001 MS	s	02L0691	11/18/02	11/25/02	11/27/02
CHROMIUM, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
CHROMIUM, TOTAL	001 REP	s	02L0691	11/18/02	11/25/02	11/27/02
CHROMIUM, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
COPPER, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
COPPER, TOTAL	001 REP	s	02L0691	11/18/02	11/25/02	11/27/02
COPPER, TOTAL	001 MS	s	02L0691	11/18/02	11/25/02	11/27/02
IRON, TOTAL	001	s	02L0691	11/18/02	11/25/02	11/27/02
						2/20101172
IRON, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	No.

Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD FO3-005 H1984

DATE RECEIVED: 11/21/02 LVL LOT # :0211L201

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
IRON, TOTAL	001 MS	s	02L0691	11/18/02	11/25/02	13/27/02
MERCURY, TOTAL	001 MS	S	02E0891	11/18/02		11/27/02
MERCURY, TOTAL	001 001 REP	S	02C0350	11/18/02	11/26/02 11/26/02	11/27/02
·	001 KEP	S	02C0350	11/18/02		11/27/02
MERCURY, TOTAL POTASSIUM, TOTAL	001 MS	S	02C0350	11/18/02	11/26/02	11/27/02
	001 001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
•	001 KEP				11/25/02	11/27/02
	001 MS	S S	02L0691	11/18/02	11/25/02	11/27/02
MAGNESIUM, TOTAL			02L0691	11/18/02	11/25/02	11/27/02
MAGNESIUM, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
MAGNESIUM, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
MANGANESE, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
MANGANESE, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
MANGANESE, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
MOLYBDENUM, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
MOLYBDENUM, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
MOLYBDENUM, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
SODIUM, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
SODIUM, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
SODIUM, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
NICKEL, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
NICKEL, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
NICKEL, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
LEAD, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
LEAD, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
LEAD, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
SELENIUM, TOTAL	001	S	02L0691	11/18/02	11/25/02	11/27/02
SELENIUM, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
SELENIUM, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
THALLIUM, TOTAL	001	s	02L0691	11/18/02	11/25/02	11/27/02
THALLIUM, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
THALLIUM, TOTAL	001 MS	s	02L0691	11/18/02	11/25/02	11/27/02
VANADIUM, TOTAL	001	s	02L0691	11/18/02	11/25/02	11/27/02
VANADIUM, TOTAL	001 REP	s	02L0691	11/18/02	11/25/02	11/27/02
VANADIUM, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02
ZINC, TOTAL	001	s	02L0691	11/18/02	11/25/02	11/27/02
ZINC, TOTAL	001 REP	S	02L0691	11/18/02	11/25/02	11/27/02
ZINC, TOTAL	001 MS	S	02L0691	11/18/02	11/25/02	11/27/02

LAB QC:

SILVER LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
		_		,	,,	,,

Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD FO3-005 H1984

DATE RECEIVED: 11/21/02 LVL LOT # :0211L201

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SILVER, TOTAL	MB1	s	02L0691	N/A	11/25/02	11/26/02
ALUMINUM LABORTORY	LC1 BS	s	02L0691	N/A	11/25/02	11/27/02
ALUMINUM, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/27/02
ARSENIC LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
ARSENIC, TOTAL	MB1	S	02L0691	A/N	11/25/02	11/26/02
BORON LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
BORON, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/26/02
BARIUM LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
BARIUM, TOTAL	MB1	s	02L0691	N/A	11/25/02	11/26/02
BERYLLIUM LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
BERYLLIUM, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/26/02
BISMUTH, LCS	LC1 BS	s	02L0691	N/A	11/25/02	11/26/02
BISMUTH, TOTAL	MB1	s	02L0691	N/A	11/25/02	11/26/02
CALCIUM LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/27/02
CALCIUM, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/27/02
CADMIUM LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
CADMIUM, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/26/02
CHROMIUM LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
CHROMIUM, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/26/02
COPPER LABORATORY	LC1 BS	s	02L0691	N/A	11/25/02	11/26/02
COPPER, TOTAL	MB1	s	02L0691	N/A	11/25/02	11/26/02
IRON LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
IRON, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/26/02
MERCURY LABORATORY	LC1 BS	. S	02C0350	N/A	11/26/02	11/27/02
MERCURY, TOTAL	MB1	S	02C0350	N/A	11/26/02	11/27/02
POTASSIUM LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/27/02
POTASSIUM, TOTAL	MB1	· S	02L0691	N/A	11/25/02	11/27/02
MAGNESIUM LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/27/02
MAGNESIUM, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/27/02
MANGANESE LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
MANGANESE, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/26/02
MOLYBDENUM LABORATOR	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
MOLYBDENUM, TOTAL	MB1	s	02L0691	N/A	11/25/02	11/26/02
SODIUM LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/27/02
SODIUM, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/27/02
NICKEL LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
NICKEL, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/26/02
LEAD LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02

Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD FO3-005 H1984

DATE RECEIVED: 11/21/02 LVL LOT # :0211L201

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
						
LEAD, TOTAL	MB1	s	02L0691	N/A	11/25/02	11/26/02
SELENIUM LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
SELENIUM, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/26/02
THALLIUM LABORATORY	LC1 BS	s	02L0691	N/A	11/25/02	11/26/02
THALLIUM, TOTAL	MB1	s	02L0691	N/A	11/25/02	11/26/02
VANADIUM LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
VANADIUM, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/26/02
ZINC LABORATORY	LC1 BS	S	02L0691	N/A	11/25/02	11/26/02
ZINC, TOTAL	MB1	S	02L0691	N/A	11/25/02	11/26/02



Analytical Report

Client: TNU-HANFORD F03-005

LVL#: 0211L201

SDG/SAF#: H1984/F03-005

W.O.#: 11343-606-001-9999-00

Date Received: 11-21-02

METALS CASE NARRATIVE

1. This narrative covers the analysis of 1 soil sample.

2. The sample was prepared and analyzed in accordance with methods checked on the attached glossary.

The sample was rerun for Aluminum, Calcium, Potassium, Magnesium, and Sodium.

- 3. All analyses were performed within the required holding times.
- 4. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits.
- 6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
- 7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
- 8. All ICP Interference Check Standards were within control limits.
- 9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.
- 10. The matrix spike (MS) recoveries for 3 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.
- 11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A serial dilution is performed for Mercury. A PDS was prepared at meaningful concentration level for the following analytes:

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of pages.

		<u>PDS</u>	PDS
Sample ID	Element	Concentration (ppb)	% Recovery
B15YP9	Aluminum	40,000	105.0
	Iron	20,000	121.8
	Manganese	2,000	103.6

- 12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
- 13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
- 14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

gmb/m11-201

2-10-02

Date



METALS METHOD GLOSSARY

~	g methods are used as refer	rence for the digestic	on and analysis	of sample	s contained within this
Leaching Pro	cedure!13101311	1312Other:			
CLP Metals_	_Digestion and _ Analysis	Methods:ILM(3.0 <u> </u>	.0	
Metals Digest	ion Methods:3005A: Other:	3010A30153	$\sqrt{3050B}$	3051	200.7SS17
		letals Analysis Me	ethods		<i>1.</i>
				EPA	
	SW846	EPA	STD MTD	OSWR	USATHAMA
Aluminum	√6010B	200.7			99
Antimony	6010B _7041 s	200.7 204.2			99
Arsenic	6910B 7060A 5	200.7 206.2	3113B	•	99
Barium	-6010B	_{200.7}	_		99
Beryllium	-6010B	200.7			99
Bismuth	6010B ·	200.7 '		1620	99
Boron	-6010B	200.7			99
Cadmium	6010B 7131A 5	200.7 213.2			99
Calcium	6010B	200.7			
Chromium	_6010B7191 ^s	200.7218.2			SS17
Cobalt	6010B	200.7			99
Copper		200.7220.2			<u></u> 99
Iron	<u></u>	200.7			99
Lead	6010B7421 ⁵	200.7239.2	_3113B		99
Lithium	6010B7430 ·	200.7		1620	99
Magnesium	<u></u>	200.7			<u>99</u>
Manganese	<u>√</u> 6010B	200.7			99
Mercury	7470A ' <u>/</u> 7471A '	245.1 1245.5 1			99
Molybdenum	<u>6010B</u>	200.7			99
Nickel	<u></u>	200.7			99
Potassium	<u> </u>	200.7258.1 4			99
Rare Earths	6010B ¹	200.7 ¹		1620	99
Selenium	<u>√6010B</u> <u>7740 °</u>	200.7270.2	3113B		99
Silicon	6010B ¹	200.7		1620	99
Silica	6010B	200.7		1620	99
Silver	_6010B7761 *	200.7272.2			99
Sodium	<u> </u>	200.7273.1 4			99
Strontium	6010B	200.7			99
Thallium	∠6010B _7841 ⁵	200.7279.22	00.9		99
Tin	6010B	200.7			99
Titanium	6010B	200.7			99
Uranium	6010B ¹	200.7 1		1620	99
Vanadium	<u>6910B</u>	200.7			99
Zine	<u></u>	200.7		,	99
Zirconium	6010B ¹	200.7 1		1620	99
Other:	Metho	d;		L-W	I-033/M-03/01 .

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LCS = Laboratory Control Sample.

NC = Not calculated.

ANALYTICAL METAL METHODS

- 1. Not included in the method element list.
- 2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).
- Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).
- 4. Flame AA.
- 5. Graphite Furnace AA.

RFW 21-21L-033/N-10/96

INORGANICS DATA SUMMARY REPORT 12/10/02

CLIENT: TNUHANFORD F03-005 H1984 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0211L201

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
=======		医疗代理检查术医检验检查检验检验检验检验	222222	****	=======================================	
-001	B15YP9	Silver, Total	0.14 u	MG/KG	0.14	1.0
		Aluminum, Total	5870	MG/KG	2.2	1.0
		Arsenic, Total	3.7	MG/KG	0.39	1.0
		Boron, Total	1.0	MG/KG	0.22	1.0
		Barium, Total	77.2	MG/KG	0.03	1.0
		Beryllium, Total	0.14	MG/KG	0.02	1.0
		Bismuth, Total	0,60 u	MG/KG	0.60	1.0
		Calcium, Total	5370	MG/KG	2.0	1.0
		Cadmium, Total	0.07	MG/KG	0.04	1.0
		Chromium, Total	12.7	MG/KG	0.10	. 1.0
		Copper, Total	12.8	MG/KG	0.13	1.0
		Iron, Total	25100	MG/KG	2.1	1.0
		Mercury, Total	0.05	MG/KG	0.02	1.0
		Potassium, Total	1230	MG/KG	51.1	1.0
		Magnesium, Total	4430	MG/KG	4.0	1.0
		Manganese, Total	392	MG/KG	0.02	1.0
		Molybdenum, Total	0.20	MG/KG	0.17	1.0
		Sodium, Total	121	MG/KG	2.6	1.0
		Nickel, Total	9.0	MG/KG	0.13	1.0
		Lead, Total	5.4	MG/KG	0.25	1.0
		Selenium, Total	0.39 u	MG/KG	0.39	1.0
		Thallium, Total	0.57 u	MG/KG	0.57	1.0
		Vanadium, Total	65.4	MG/KG	0.10	1.0
		Zinc, Total	47.6	MG/KG	0.08	1.0

INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/10/02

CLIENT: TNUHANFORD F03-005 H1984 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0211L201

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	result	UNITS	LIMIT	FACTOR
======	*****		******	****		=======
BLANK1	02L0691-MB1	Silver, Total	0.14 u	MG/KG	0.14	1.0
		Aluminum, Total	2,2 u	MG/KG	2.2	1.0
		Arsenic, Total	0.38 u	MG/KG	0.38	1.0
		Boron, Total	0.21 u	MG/KG	0.21	1.0
		Barium, Total	0.04	MG/KG	0.03	1.0
		Beryllium, Total	0.02 u	MG/KG	0.02	1.0
		Bismuth, Total	0.59 u	MG/KG	0.59	1.0
		Calcium, Total	3.0	MG/KG	1.9	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	0.26	MG/KG	0.10	. 1.0
		Copper, Total	0.20	MG\KG	0.13	1.0
		Iron, Total	2.0 u	MG/KG	2.0	1.0
		Potassium, Total	49.8 u	MG/KG	49.8	1.0
		Magnesium, Total	3.9 u	MG/KG	3.9	1.0
		Manganese, Total	0.04	MG/KG	0.02	1.0
		Molybdenum, Total	0.18	MG/KG	0.17	1.0
		Sodium, Total	4.6	MG/KG	2.6	1.0
		Nickel, Total	0.13 u	MG/KG	0.13	1.0
		Lead, Total	0.24 น	MG/KG	0.24	1.0
		Selenium, Total	0.38 u	MG/KG	0.38	1.0
		Thallium, Total	0.56 u	MG/KG	0.56	1.0
		Vanadium, Total	0.10 u	MG/KG	0.10	1.0
		Zinc, Total	0.14	MG/KG	0.08	1.0
BLANK1	02C0350-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

INORGANICS ACCURACY REPORT 12/10/02

CLIENT: TNUHANFORD FO3-005 H1984 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0211L201

			SPIKED	INITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	SAMPLE	RESULT	TMUOMA	*RECOV	FACTOR (SPK)
****		***************	****	*****		***===	#=# CF # = # B #
-001	B15YP9	Silver, Total	5.3	0,14u	5.1	103.9	1.0
		Aluminum, Total	6570	5870	203	343.7*	1.0
		Arsenic, Total	204	3.7	203	98.9	1.0
•		Boron, Total	95.9	1.0	102	93.5	1.0
		Barium, Total	283	77.2	203	101.6	1.0
		Beryllium, Total	5.2	0.14	5.1	99.2	1.0
		Bismuth, Total	486	0.60u	508	95.7	1.0
		Calcium, Total	7970	5370	2540	102.4	1.0
		Cadmium, Total	5.3	0.07	5.1	102.6	1.0
		Chromium, Total	36.2	12.7	20.3	115.8	1.0
		Copper, Total	39.0	12.8	25.4	103.2	1.0
		Iron, Total	26100	25100	102	1046 *	1.0
		Mercury, Total	0.22	0.05	0.16	101.2	1.0
		Potassium, Total	3660	1230	2540	95.7	1.0
		Magnesium, Total	7170	4430	2540	107.9	1.0
		Manganese, Total	470	392	50.7	154.6*	1.0
		Molybdenum, Total	102	0.20	102	99.8	1.0
		Sodium, Total	2630	121	2540	99.0	1.0
		Nickel, Total	62.2	9.0	50.7	104.9	1.0
		Lead, Total	56.8	5.4	50.7	101.4	1.0
		Selenium, Total	193	0.39u	203	95.0	1.0
		Thallium, Total	210	0.57u	203	103.7	1.0
		Vanadium, Total	118	65.4	50.7	103.4	1.0
		Zinc, Total	100	47.6	50.7	103.7	1.0

INORGANICS PRECISION REPORT 12/10/02

CLIENT: TNUHANFORD F03-005 H1984

WORK	ORDER:	11343-606-001-9999-00
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			INITIAL			DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	REPLICATE	RPD	FACTOR (REP)
******	****			=========	##5###	*****
-001RBP	B15YP9	Silver, Total	0.14u	0.13u	NC	1.0
		Aluminum, Total	5870	5400	8.3	1.0
		Arsenic, Total	3.7	4.4	17.3	1.0
		Boron, Total	1.0	0.79	23.0	1.0
		Barium, Total	77.2	80.0	3.6	1.0
		Beryllium, Total	0.14	0.14	1.4	1.0
		Bismuth, Total	0.60u	0.55u	ЙC	1.0
		Calcium, Total	5370	5580	3.7	1.0
		Cadmium, Total	0.07	0.06	13.2	1.0
		Chromium, Total	12.7	14.2	11.2	. 1.0
		Copper, Total	12.8	13.5	5.3	1.0
		Iron, Total	25100	24600	1.9	1.0
		Mercury, Total	0.05	0.06	9.5	1.0
		Potassium, Total	1230	1160	6.2	1.0
		Magnesium, Total	4430	4340	2.1	1.0
		Manganese, Total	392	393	0.23	1.0
		Molybdenum, Total	0.20	0.32	42.5	1.0
		Sodium, Total	121	104	15.6	1.0
		Nickel, Total	9.0	10.2	12.5	1.0
		Lead, Total	5.4	5.3	1.9	1.0
		Selenium, Total	0.39u	0.35u	NC	1.0
		Thallium, Total	0.57u	0.52u	NC	1.0
		Vanadium, Total	65.4	62.9	3.9	1.0
		Zinc, Total	47.6	47.5	0.21	1.0

INORGANICS LABORATORY CONTROL STANDARDS REPORT 12/10/02

CLIENT: TNUHANFORD F03-005 H1984
WORK ORDER: 11343-606-001-9999-00

02C0350-LC1 Mercury, LCS

LCS1

LVL LOT #: 0211L201

2.3 2.5 MG/KG 92.4

WORK ORDE	R: 11343-606-001-9999-	00				
			SPIKED	SPIKED		
SAMPLE	SITE ID	ANALYTE	SAMPLE	AMOUNT	UNITS	*RBCOV
*****		苏花宝彩花妆金鱼花妆金色彩色金加 克鱼的菜类	***	***	B==#R#	*====
LCS1	02L0691-LC1	Silver, LCS	49.8	50.0	MG/KG	99.6
		Aluminum, LCS	488	500	MG/KG	97.5
		Arsenic, LCS	949	1000	MG/KG	94.9
		Boron, LCs	472	500	MG/KG	94.4
		Barium, LCS	494	500	MG/KG	98.8
		Beryllium, LCS	24.5	25,0	MG/KG	98.0
		Bismuth, LCS	485	500	MG/KG	97.0
		Calcium, LCS	2420	2500	MG/KG	96.8
		Cadmium, LCS	24.7	25.0	MG/KG	98.8
		Chromium, LCS	51.6	50.0	MG/KG	103.2
		Copper, LCS	126	125	MG/KG	101.0
		Iron, LCS	50 <i>6</i>	500	MG/KG	101.2
		Potassium, LCS	2380	2500	MG/KG	95.4
		Magnesium, LCS	2390	2500	MG/KG	95.4
		Manganese, LCS	78.0	75.0	MG/KG	104.0
		Molybdenum, LCS	512	500	MG/KG	102.4
		sodium, LCS	2440	2500	MG/KG	97.5
		Nickel, LCS	200	200	MG/KG	99.9
		Lead, LCS	247	250	MG/KG	98.9
		Selenium, LCS	910	1000	MG/KG	91.0
		Thallium, LCS	999	1000	MG/KG	99.9
		Vanadium, LCS	258	250	MG/KG	103.3
		Zinc, LCS	98.6	100	MG/KG	98.6

Lionville Labora	atory U	se Only	Custo	dy Tr	ansfe	er F	?ecc	ord/L	ab V	VO	rk	He	qu	esi	Pag	je <u>.</u> _	or .				3 6	V	í	I
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FLUOR H	lanford Inc.	CF	HAIN OF CUST	ODY/S	AMPL	E ANALY	SIS	REOUEST	· \	F03-	005-015	Page 1	of 1
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Project Designation	acterization 200-CS-1 OU - Was	Sampli	ng Location	3,00				SAF No. F03-005	Ai	ir Quality		45 1	Days
Ice Chest No. EQC - 99			ostook No. NF - N - 32		COA 117514E	S10	-	Method of Shipment Federal Express					
Shipped To	RA PAS			300	 _			Bill of Lading/		92.	05	PCV	
POSSIBLE SAMPLE	HAZARDS/REMARKS	102-1	<u> </u>	1	75	77	1			1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	[
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LABORATORY Res	ceived By	· —		T	itle							Date/Time	
FINAL SAMPLE DE DISPOSITION	sposal Method					Dispos	ed By	-1				Date/Time	

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

CLIENT: Thu Hardord

Purchase Order/Project:

DATE: 11 21 02

SAF#) SOW# / Release #: F03-005

Laboratory SDG #:

NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION Custody seals on coolers or shipping SJ/Yes □ N/A See Comment # container intact, signed and dated? Outside of coolers or shipping containers are D No D N/A D see Comment # free from damage? 3. Airbill # recorded? O No D N/A ☐ see Comment # All expected paperwork received (coc and other client specific: historical data, O No D N/A ☐ see Comment # alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid) Sample containers are intact? Ó2∕Yes □ No D N/A ☐ see Comment # 6. Custody seals on sample containers intact. □ No D see Comment # signed and dated? 7. All samples on coc received? Ø Yes □ No □ N/A D see Comment # All sample label information matches coc? □ No D see Comment # D N/A 9. Laboratory QC samples designated on coc? □ No □ N/A ☐ see Comment # (QC stickers placed on bottles?) 10. Shipment meets LvLI Sample Acceptance Z Yes D No D N/A ☐ see Comment # Policy? (identify all bottles not within policy. See reverse side for policy) 11. Where applicable, bar code labels are D Yes D No DAN/A ☐ sec Comment # affixed to coc? TYes 12. coc signed and dated? □ No D N/A See Comment # 13. coc will be faxed or emailed to client? V Yes □ No D N/A D see Comment # 14. Project Manager/Client contacted EN/A D Yes □ No C see Comment # concerning discrepancies? (name/date)

Cooler # / temp (°C) and Comments:

Elc. 99.030/ 12°

Laboratory Sample Custodian:

Laboratory Project Manager:

niturala



Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-005 H1984

DATE RECEIVED: 11/21/02 LVL LOT # :0211L201

CLIENT ID /ANALYSIS	LVL #	МТХ	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
				*		
B15YP9						
% SOLIDS	001	s	02L%S129	11/18/02	11/25/02	11/26/02
% SOLIDS	001 REP	S	02L%S129	11/18/02	11/25/02	11/26/02
CHLORIDE BY IC	001	S	02LIC085	11/18/02	12/19/02	12/19/02
CHLORIDE BY IC	001 REP	S	02LIC085	11/18/02	12/19/02	12/19/02
CHLORIDE BY IC	001 MS	S	02LIC085	11/18/02	12/19/02	12/19/02
FLUORIDE BY IC	001	S	02LIC085	11/18/02	12/19/02	12/19/02
FLUORIDE BY IC	001 REP	S	02LIC085	11/18/02	12/19/02	12/19/02
FLUORIDE BY IC	001 MS	S	02LIC085	11/18/02	12/19/02	12/19/02
NITRITE BY IC	001	S	02LICA85	11/18/02	12/19/02	12/19/02
NITRITE BY IC	001 REP	S	02LICA85	11/18/02	12/19/02	12/19/02
NITRITE BY IC	001 MS	S	02LICA85	11/18/02	12/19/02	12/19/02
NITRATE BY IC	001	S	02LICA85	11/18/02	12/19/02	12/19/02
NITRATE BY IC	001 REP	S	02LICA85	11/18/02	12/19/02	12/19/02
NITRATE BY IC	001 MS	S	02LICA85	11/18/02	12/19/02	12/19/02
TOTAL CYANIDE	001	S	02LCD91	11/18/02	11/25/02	11/25/02
TOTAL CYANIDE	001 REP	S	02LCA91	11/18/02	11/25/02	11/25/02
TOTAL CYANIDE	001 MS	S	02LCA91	11/18/02	11/25/02	11/25/02
PHOSPHATE BY IC	001	S	02LICA87	11/18/02	12/23/02	12/23/02
PHOSPHATE BY IC	001 REP	S	02LICA87	11/18/02	12/23/02	12/23/02
PHOSPHATE BY IC	001 MS	S	02LICA87	11/18/02	12/23/02	12/23/02
CHROMIUM VI	001	S	02FA1038	11/18/02	12/05/02	12/05/02
CHROMIUM VI	001 REP	S	05TA1038	11/18/02	12/05/02	12/05/02
CHROMIUM VI	001 MS	S	02LVI038	11/18/02	12/05/02	12/05/02
CHROMIUM VI	001 MSD	S	02LVI038	11/18/02	12/05/02	12/05/02
SULFATE BY IC	001	S	02LICC85	11/18/02	12/19/02	12/19/02
SULFATE BY IC	001 REP	S	02LICC85	11/18/02	12/19/02	12/19/02
SULFATE BY IC	001 MS	S	02LICC85	11/18/02	12/19/02	12/19/02
NITRATE NITRITE	001	S	02LN3090	11/18/02	12/16/02	12/16/02
NITRATE NITRITE	001 REP	S	02LN3090	11/18/02	12/16/02	12/16/02
NITRATE NITRITE	001 MS	S	02LN3090	11/18/02	12/16/02	12/16/02
AMMONIA	001	S	02LAMA34	11/18/02	12/02/02	12/05/02
AMMONIA	001 REP	S	02LAMA34	11/18/02	12/02/02	12/05/02
AMMONIA	001 MS	S	02LAMA34	11/18/02	12/02/02	12/05/02
PH	001	S	02LPH095	11/18/02	11/25/02	11/25/02
РН	001 REP	S	02LPH095	11/18/02	11/25/02	11/25/02

Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD F03-005 H1984

DATE RECEIVED: 11/21/02 LVL LOT # :0211L201 LVL # MTX PREP # COLLECTION EXTR/PREP CLIENT ID /ANALYSIS ANALYSIS S 02LSDA56 11/18/02 11/25/02 001 11/25/02 SULFIDE S 02LSDA56 11/18/02 11/25/02 001 REP SULFIDE 11/25/02 S 02LSDA56 11/18/02 11/25/02 001 MS 11/25/02 SULFIDE LAB QC: S 02LIC085 N/A 12/19/02 S 02LIC085 N/A 12/19/02 S 02LIC085 N/A 12/19/02 S 02LIC085 N/A 12/19/02 S 02LICA85 N/A 12/19/02 MB1 CHLORIDE BY IC 12/19/02 CHLORIDE BY IC MB1 BS 12/19/02 MB1 FLUORIDE BY IC 12/19/02 MB1 BS FLUORIDE BY IC 12/19/02 MB1 NITRITE BY IC 12/19/02 MB1 BS NITRITE BY IC 12/19/02 NITRATE BY IC MB1 12/19/02 NITRATE BY IC MB1 BS 12/19/02 LCS L S 02LCD91 TOTAL CYANIDE N/A 11/25/02 11/25/02 S 02LCD91 LCS L TOTAL CYANIDE N/A 11/25/02 11/25/02 11/25/02 11/25/02 TOTAL CYANIDE MB1 S 02LCD91 N/A TOTAL CYANIDE LCS L S 02LCA91 N/A 11/25/02 11/25/02 TOTAL CYANIDE LCS L S 02LCA91 N/A 11/25/02 11/25/02 TOTAL CYANIDE MB1 S 02LCA91 N/A 11/25/02 11/25/02 PHOSPHATE BY IC MB1 S 02LICA87 N/A12/23/02 12/23/02 PHOSPHATE BY IC MB1 BS S 02LICA87 N/A 12/23/02 12/23/02 S 02LVI038 CHROMIUM VI MB1 N/A 12/05/02 12/05/02 CHROMIUM VI MB1 BS S 02LVI038 N/A12/05/02 12/05/02 S 02LVI038 CHROMIUM VI MB1 BSD N/A 12/05/02 12/05/02 SULFATE BY IC S 02LICC85 MB1 12/19/02 N/A12/19/02 SULFATE BY IC MB1 BS S 02LICC85 N/A 12/19/02 12/19/02 NITRATE NITRITE S 02LN3090 MB1 N/A12/16/02 12/16/02 S 02LN3090 NITRATE NITRITE MB1 BS N/A 12/16/02 12/16/02 N/A 12/02/02 N/A 12/02/02 N/A 12/02/02 N/A 11/25/02 N/A 11/25/02 AINOMMA MB1 S 02LAMA34 N/A12/05/02 MB1 BS S 02LAMA34 AINOMMA 12/05/02 S 02LAMA34 S 02LSDA56 AMMONIA MB1 BSD 12/05/02 SULFIDE MB1 11/25/02

S 02LSDA56

MB1 BS

SULFIDE

11/25/02

1



Analytical Report

Client: TNU-HANFORD F03-005 H1984

LVL#: 0211L201

W.O.#: 11343-606-001-9999-00

Date Received: 11-21-02

INORGANIC NARRATIVE

This narrative covers the analyses of 1 soil sample. 1.

- The sample was prepared and analyzed in accordance with the methods indicated on the attached 2. glossary.
- 3. Sample holding times as required by the method and/or contract were met.
- The results presented in this report are derived from samples that met LvLI's sample acceptance 4. policy.
- The method blanks were within the method criteria. 5.
- The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate 6. LCS for Ammonia was within the 20% Relative Percent Difference (RPD) control limit.
- 7. The matrix spike recoveries for Chloride, Fluoride, Nitrite, Nitrate, Total Cyanide, Phosphate, Chromium VI, Sulfate, Nitrate Nitrite, Ammonia and Sulfide were within the 75-125% control limits.
- The replicate analyses for Percent Solids, Chloride, Fluoride, Nitrite, Nitrate, Total Cyanide, 8. Phosphate, Chromium VI, Ammonia, pH and Sulfide were within the 20% RPD control limit, however replicate analyses for Sulfate and Nitrate Nitrite were outside the control limit that may be attributed to sample inhomogeneity.
- 9. Results for solid samples are reported on a dry weight basis.
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

Lionville Laboratory Incorporated

WET CHEMISTRY

METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

	<u>ASTM</u>	SW846	OTHER
% Ash	D2216-80		·
% Moisture	D2216-80		ILMO4.0 (e)
% Solids	D2216-80		ILMO4.0 (e)
% Volatile Solids	D2216-80		
ASTM Extraction in Water	D3987-81/85		•
BTU	D240-87		
CEC		9081	c
Chromium VI		3060A/7196A	
Corrosivity by coupon by pH		1110(mod) 9045C	
Cyanide, Total		V 9010B/9014	ILMO4.0 (e)
Cyanide, Reactive		Section 7.3/9014	_
Halides, Extractable Organic		9020B	EPA 600/4/84-008
Halides, Total		9020B	EPA 600/4/84-008
EP Toxicity		1310A	
Flash Point		1010	
Ignitability		1010	
Oil & Grease		9071A	
Carbon, Total Organic		9060	Lloyd Kahn (mod)
Oxygen Bomb Prep for Anions	D240-87(mod)	5050	_
Petroleum Hydrocarbons, Total Reco	verable	9071	EPA 418.1
pH, Soil		√9045C	
Sulfide, Reactive		Section 7.3/9030B	
Sulfide		$\sqrt{9030B \text{(mod)}}$	
Specific Gravity	D1429-76C/ _	D5057-90	4
Sulfur, Total		9056	
Synthetic Preparation Leach		1312	ı
Paint Filter		9095A	1
Other: Bearide Huaride M.	trate Method:	PA 300,0 (mod.)	
Other: Nitrete Phosphote Su			
Aitrate Aitrite	E	PA 353.2 (mod.) A 39.3 (mod.)	
amnonia	B	4 39.3 (mad.)	•

Lionville Laboratory Incorporated

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LC = Laboratory Control Sample.

NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

ANALYTICAL WET CHEMISTRY METHODS

- ASTM Standard Methods.
- 2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).
- 3. <u>Test Methods for Evaluating Solid Waste</u> (USEPA SW-846).
- a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).
- b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).
- c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).
- d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).
- e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.
- f. Code of Federal Regulations.

INORGANICS DATA SUMMARY REPORT 12/27/02

CLIENT: TNUHANFORD F03-005 H1984 WORK ORDER: 11343-606-001-9999-00

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	result	UNITS	LIMIT	PACTOR
***	医血管水管医疗基型效应医液水压医 炎水压医			****	金属电量机器电容率单	******
~001	B15YP9	% Solids	94.7	*	0.01	1.0
		Chloride by IC	1,4	MG/KG	1.3	1.0
		Fluoride by IC	1.3 u	MG/KG	1.3	1.0
		Nitrite by IC	1.32 u	MG/KG	1.32	1.0
		Nitrate by IC	41.4	MG/KG	1.32	1.0
		Cyanide, Total	0.40 u	MG/KG	0.40	1.0
		Phosphate by IC	2.4	MG/KG	1.3	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
		Sulfate by IC	7.6	MG/KG	1.3	1.0
		Nitrate Nitrite	10.9	MG/KG	1.0	5.0
		Ammonia, as N	2.5 u	MG/KG	2.5	1.0
		рĦ	8.1	SOIL PH	0.01	1.0
		Sulfide	24.2 u	MG/KG	24.2	1.0

INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/27/02

CLIENT: TNUHANFORD F03-005 H1984

WORK	ORDER:	11343-606-001-9999-00
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					rbporting	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
		***************	*==##==#			
BLANK10	02LIC085-MB1	Chloride by IC	1.2 u	MG/KG	1.2	1.0
		Fluoride by IC	1.2 u	MG/KG	1.2	1.0
		Nitrite by IC	1.25 u	MG/KG	1.25	1.0
		Nitrate by IC	1.25 u	MG/KG	1.25	1.0
		Sulfate by IC	1.2 u	MG/KG	1.2	1.0
BLANK10	02LICA85-MB1	Nitrite by IC	1.25 u	MG/KG	1.25	1.0
		Nitrate by IC	1.25 u	MG/KG	1.25	1.0
BLANKI	02LCD91-MB1	Cyanide, Total	0.50 u	MG/KG	0.50	1.0
BLANK1	02LCA91-MB1	Cyanide, Total	0.50 u	MG/KG	0.50	1.0
BLANK10	02LICA87-MB1	Phosphate by IC	1.2 u	MG/KG	1.2	1.0
BLANK10	02LVI036-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0
BLANK10	02LICC85-MB1	Sulfate by IC	1.2 u	MG/KG	1.2	1.0
BLANK10	02IN3090-MB1	Nitrate Nitrite	0.20 u	MG/KG	0.20	1.0
BLANK10	02IAMA34-MB1	Ammonia, as N	2.5 u	MG/KG	2.5	1.0
BLANK10	02LSDAS6-MB1	Sulfide	40.0 u	MG/KG	40.0	1.0

INORGANICS ACCURACY REPORT 12/27/02

CLIENT: TNUHANFORD F03-005 H1984 WORK ORDER: 11343-606-001-9999-00

			SPIKED	INITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	SAMPLE	RESULT	AMOUNT.	*RBCOV	Factor (SPK)
BFES#55	不是是实际等的表现实是是有关处理的现在分词		Epsess			224222	========
-001	B15YP9	Chloride by IC	55.3	1.4	53.0	101.7	2.0
		Fluoride by IC	55.6	0.69	53.0	103.5	2.0
		Nitrite by IC	51.3	1.32u	53.0	96.8	2.0
		Nitrate by IC	97.3	41.4	53.0	105.5	2.0
		Cyanide, Total	5.15	0.40u	5.30	97.2	1.0
		Phosphate by IC	30.0	2.4	26.0	106.2	1.0
		Soluble Chromium VI	4.7	0.42	4.2	113.7	1.0
		Insoluble Chromium VI	1270	0.42	1160	109.7	100
		Sulfate by IC	62.1	7.6	\$3.0	102.8	2.0
		Nitrate Nitrite	30.1	10.9	24.2	79.6	5.0
		Ammonia, as N	96.8	2.5 u	98.6	98.2	1.0
		Sulfide	250	7.3	259	93.6	1.0
BLANK10	02LIC085-MB1	Chloride by IC	23.6	1.2 u	25.0	94.5	.1.0
		Fluoride by IC	26.3	1.2 u	25.0	105.2	1.0
		Nitrite by IC	24.4	1.25u	25.0	97.7	1.0
		Nitrate by IC	24.0	1.25u	25.0	96.0	1.0
		Sulfate by IC	23.8	1.2 u	25.0	95.4	1.0
BLANK10	02LICA85-MB1	Nitrite by IC	24.4	1.25u	25.0	97.7	1.0
		Nitrate by IC	24.0	1.25u	25.0	96.0	1.0
BLANK10	02LICA87-MB1	Phosphate by IC	24.3	1.2 น	25.0	97.0	1.0
BLANK10	02LVI038-MB1	Soluble Chromium VI	4.2	0.40u	4.0	104.6	1.0
		Insoluble Chromium VI	1320	0.40u	1220	108.3	100
BLANK10	02LICC85-MB1	Sulfate by IC	23.8	1.2 u	25.0	95.4	1.0
BLANK10	02LN3090-MB1	Nitrate Nitrite	4.8	0.20u	5.0	96.8	1.0
BLANK10	02LAMA34-MB1	Ammonia, as N	102	2.5 ບ	100	102.0	1.0
		Ammonia, as N MSD	104	2.5 u	100	103.8	1.0
BLANK10	02LSDA56-MB1	Sulfide	458	40.0 u	448	102.1	1.0

INORGANICS DUPLICATE SPIKE REPORT 12/27/02

CLIENT: TNUHANFORD F03-005 H1984

LVL LOT #: 0211L201

WORK ORDER: 11343-606-001-9999-00

SPIKE#1 SPIKE#2

SAMPLE	SITE ID	ANALYTE	*RBCOV	*RECOV	*DIFF
		表面 新生产 医生物 医甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基			
BLANK10	02LAMA34-MB1	Ammonia, as N	102.0	103.8	1.7

INORGANICS PRECISION REPORT 12/27/02

CLIENT: TNUHANFORD F03-005 H1984

WORK	ORDER:	11343-606-001-9999-00

			INITIAL			DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	REPLICATE	RPD	FACTOR (REP)
	- 12 - 12 - 12 - 12 - 13 - 13 - 13 - 13			第四周亚苯基苯苯二	医非常有面积效	医智术异性性处理医生
-001RRP	B15YP9	% Solids	94.7	94.8	0.17	1.0
		Chloride by IC	1.4	1.4	1.5	1.0
		Fluoride by IC	1.3 u	1.3 u	NC	1.0
		Nitrite by IC	1.32u	1.32u	NC	1.0
•		Nitrate by IC	41.4	35.4	15.6	1.0
		Cyanide, Total	0.40u	0.50u	NC	1.0
		Phosphate by IC	2.4	2.4	0.25	1.0
		Chromium VI	0.42u	0.42u	ИС	1.0
		Sulfate by IC	7.6	6.1	22.3	1.0
		Nitrate Nitrite	10.9	8.0	30.6	5.0 .
		Ammonia, as N	2.5 u	2.6 u	NC	1.0
		pН	8.1	8.1	0.1	1.0
		Sulfide	24.2 u	26.1 u	NC	1.0

INORGANICS LABORATORY CONTROL STANDARDS REPORT 12/27/02

CLIENT: TNUHANFORD F03-005 H1984 NORK ORDER: 11343-606-001-9999-00

			SPIKED	SPIKED		
SAMPLE	SITE ID	ANALYTE	SAMPLE	TRUOMA	UNITS	*RECOV
*****	*************		*****	==4===	*====	
LCS\$1	02LCD91-LCS1	Cyanide, Total LCS	1.92	2.0	MG/KG	96.0
LCSS2	02LCD91-LCS2	Cyanide, Total LCS	9.99	10.0	mg/kg	99.9
LCS81	02LCA91-LCS1	Cyanide, Total LCS	2.04	2.0	MG/KG	102.0
LCSS2	02LCA91-LCS2	Cyanide, Total LCS	9.66	10.0	MG/KG	96.6

Lionville Labor	atory (Jse Only	Custo	ody T	ran	sfe	r F	Reco	ord/L	.ab	Wo	rk	Re	qu	esi	Page_	<u>of</u>			E		1/1	
0211	Lac) IC	FI	ELD PER	BONNE	EL: C	OMP	LETE (ONLY SH	IADED /	AREA	_	0		4		E		F	G		APIT 1 MEOS	ALOSA INC.
				03 000				Retrige	rator #		/*	<u>B</u>	14		D		4	,	4	4	1		
CHem 1110A FIGURES 103 003								Liquid	 `	<u> </u>	\`				1						+		
Est. Final Proj. Sampling Date							#/Туре	Container	Solid	lac	100	lac		las		1	-	10	10.0	_ †		+	
3		ne #		1 1 1/1 - 3		·,				Liquid	8				W.S	-	lac		la.				1-1
Lionville Lab	oratory	Project Mana	cer (071	Datt.	and	<u>~ Δ</u>	$\overline{\mathcal{C}}_{n}$	Volume	ı	Solid	4	39	250	<u> </u>	laO		125	 	500	-		_	+-
ac SPEC		Del	TAT	30 Day	A		-	Preserv	vatives	- 		-					-	1	-	-			
Date Rec'd 11-21-02 Date Due 12-21-02								√0¢ VoA	7	ANIC	1 6 9	Alcohols Sixols			ORG	3,50	古						
MATRIX			·			Mar	trix	 		T		J	1	1				boratory Use Only			1		إخلا
S- Soil SE- Sediment SO - Solid SL - Studge	Lab ID		Client ID/Desc	ription	!	Cho (+	\$ 6 11	Matrix	Date Collected	Time Collected	#+240	0 6 2 5 x	ofer		OGESC		METO Ecre		ZNORGE	I b H			
W - Water O - Oil	ωi.	B1571	29				X	S	11.18-02	0905		X			X.		X		X	X		-	+
A - Air DS - Drum	<u> </u>			-																			
Solids DL - Drum	<u> </u>			·						<u></u>													
Liquids				<u></u>				السنسيد	-		<u> </u>												
Leachate WI - Wige				<u> </u>									<u> </u>										
X - Other F - Fish				 				<u></u>									<u> </u>	<u> </u>					
- 1-11										. <u>.</u>								<u> </u>					
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Special Instruct	lons:	24E #	F03-	005		ı	DATE/	REVISION	is: . Ac B•	C. C	P	Se.	A	AL B	. B.	B Ca.				le Labor		ise Only	
						-			Cu, Fe,								1)		werez d vered _		1) Pr	er Resistant resent on C cage	Outer
				_		3	enor	6 O s	ECLL.	CCFL,)	CC MO:	L	NOZ	, LCA	14,7	c504.	Air	b## #		 3344	2) Ur	nbrok <u>en</u> or	n Outer
00to -	Repor	+ KRO + 3)RO Con	borr gz				4	IN3N2	INH	3N,	ZSF	D . :	ECNT	0				COLT			rage(Y) (resent <u>on</u> s	Sample
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Relinquished		Received by	Date	Time	Reli	nquist	red	6	Received by	l	Rte	Tim	e		pancies les Lab	s Between	ې ا∟	operty P	C or	N	COC	Record P Sample F	resent Rec't
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HEN EX WASTE REW								EWR	177	EN-	-	NOTE	5 :	-		•	(A) on	N	Temp	. <u>1.2</u>	- °C		

FLUOR H	lanford Inc.	CI	IAIN OF CUST	ODY/S	AMPL	E ANALY	YSIS	REO	UEST		F03-	005-015	Page 1	of 1	
Collector R. Nie	Son	Compa	nv Contact e Trent	Telepho 373-5	ne No.				Coordina	ter Pr	ice Code	8N	Data Tui		
Project Designation	racterization 200-CS-1 OU - Wast		ng Location				_	SAF No. F03-005			Air Quality 🗌			Days	
Ice Chest No.	GE0-1	Field I	oebook No. NF - N- 32	5/	COA 117514E	\$10		Method of Shipment Federal Express							
Shipped To PEC	CRA DAS /	Offsite	Property No. Ac	300	043			Bill of	Lading/A	ír Bill No.	9l-	e 051 -15m	المحاد		
POSSIBLE SAMPLE	HAZARDS/REMARKS	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool	4C	None	None	None	None	None	\		
Special Handling ar	•		Type of Container	G	aG	G G		G/P C		G/P	G/P	G/P	G/P		
operat manufing at	uwoi stoinge		No. of Container(s)	1	1	1	1	1		1	i	1	1		
			Volume	60g	250g	60g	250		125g	500g	60g	1010	500g		
	SAMPLE ANALY	SIS		(TCL)	See atom (1) Special Instructions	Giyoola, &	PCBs -		item (2) in Special structions	Sec item (3) in Special Instructions.	pH (Soil) - 9045	See item 4) in Special Instructions.	Nickel-63; Technetium- 99; Tritium- H3 R J) 18/102-	
Sample No.	Matrix *	Sample Date	Sample Time										1 N 12		
B15YP9	SOIL	11-18-02	2 0905	X	X	<u> </u>	\vdash		<u> </u>	<u> </u>	K	HX.			
										re	ersonnel not linquish san ef#[A				
CHAIN OF POS	SESSION	Sign/Prin	t Names	<u></u>	SPI	ECIAL INSTR	UCTIO	ONS	1			<u></u>	ł	Matrix *	
Refinquished By/Removed F Relinquished By/Removed F Relinquished By/Removed F Relinquished By/Removed F Relinquished By/Removed F	te/Time	(1) (2) (2) (C) (C) (C) (I) (Me (3) (3) (4) (1) (4) (1) (4) (1) (2)	(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Aluminum, Beryllium, Bismuth, Boron, Calcium, Copper, Iron, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Sodium, Thallium, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196 (3) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; NO2/NO3 - 353.2; Anmonia - 350.3; Sulfides - 9030; Total Cyanide - 9010 (4) Gross Alpha; Gross Beta; Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, L-Liqui								SE=Sediment SO=Solid SI=Shedge W = Water C=Oil				
2,20020	ceived By	<u> </u>	<u></u>	T	itie	 —————————————————————————————————				·	<u>-</u>	£	ate/Time	 	
FINAL SAMPLE Dis	sposal Method					Dispo	sed By					1	Date/Time		

LIONVILLE LABORATORY INCORPORATED SAMPLE RECEIPT CHECKLIST

CLIENT: Thu Harmord

Purchase Order/Project:

DATE: 11.21.02

BONIA

SAF#) SOW# / Release #: F03-005

Laboratory SDG #:

111201 NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION Custody seals on coolers or shipping □ No **∑**// es D N/A see Comment # container intact, signed and dated? Outside of coolers or shipping containers are □ N/A ☐ see Comment # free from damage? Airbill # recorded? □ No D N/A ☐ see Comment # All expected paperwork received (coc and □ No other client specific: historical data, D N/A D see Comment # alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid) Sample containers are intact? Ď⁄Yes □ No □ N/A See Comment # Custody seals on sample containers intact, ₽¥es D No D N/A D see Comment # signed and dated? All samples on coc received? D No D N/A ☐ see Comment # D Yes D No D N/A D see Comment # All sample label information matches coc? 9. Laboratory QC samples designated on coc? D N/A See Comment # (QC stickers placed on bottles?) 10. Shipment meets LvLI Sample Acceptance XY Yes D No D N/A ☐ see Comment # Policy? (identify all bottles not within policy. See reverse side for policy) 11. Where applicable, bar code labels are ☐ Yes □ No AVAÇ ☐ see Comment # affixed to coc? 'PYes D No DNA ☐ see Comment # 12. coc signed and dated? 13. coc will be faxed or emailed to client? M Yes D No □ N/A ☐ see Comment #

D Yes

□ No

Cooler # / temp (°C) and Comments:

14. Project Manager/Client contacted

concerning discrepancies? (name/date)

Elc. 99.030/ 1.200

Laboratory Sample Custodian:

Tem W. Co

Laboratory Project Manager:

☐ see Comment #